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EDITORIAL

CORONARY DISEASE

For long we have been accustomed to a steady decline in the general death rate and a steady increase in the mean duration of life, generally running parallel with the material welfare of the populations concerned. Good health appeared to go with high standards of living.

It has long been recognized, too, that from some diseases the mortality has decreased more than from others. Since the conquest of the formidable epidemic diseases it is from respiratory diseases, diarrhoeal diseases and tuberculosis that mortality has fallen to the greatest extent, while diseases of the heart and arteries, and cancer, remain as the greatest causes of death in the western world. An associated fact is that a greater reduction of mortality has taken place in infants and young children than in the middle-aged and elderly.

Circulatory diseases (and cancer) have moved in an opposite direction to the general reduction trend in mortality. In the last quarter of a century the increase in coronary heart disease has forced itself on the attention of the medical profession. In the United States the mortality from this condition in men aged 50-65 years has more than doubled in 25 years, and in other countries a mounting mortality from coronary disease is noted. In the Korean war over half the hearts of American soldiers killed in action showed developing atherosclerosis; their average age was 22. Braun [1] in his presidential address at a recent medical congress dealt with the increase of coronary disease in South Africa. From middle age onwards this upward trend threatens to neutralize the familiar downward trend in deaths from other causes.

With the growing recognition of these facts attention is to an increasing extent being focussed on coronary disease and its causation. A distinguished worker in this field, Professor Ancel Keys, of the University of Minnesota, who has pursued his researches in many countries and collaborated widely with other workers,

VAN DIE REDAKSIE

KRANSSLAGAARSIEKTE

Vir 'n geruime tyd al is ons gewoond aan 'n gestadige daling in die algemene sterftesyfer en 'n gestadige styging in die gemiddelde lewensduur wat in die reël ooreenstem met die materiële voorspoed van die betrokke volk. Gesondheid en 'n hoë lewenspeil het oënskynlik hand aan hand gegaan.

Dit is ook al lank bekend dat die sterftesyfer vir sekere siektes meer as dié vir andere gedaal het. Sedert die gedugte epidemiese siektes oormeester is, het die sterftesyfers vir asemhalingsiektes, diarree-siektes en tering die meeste gedaal, terwyl kanker en siektes van die hart en die slagare agterweë gebly het en vir die meeste sterfgevalle in die westerse lande verantwoordelik is. Dit moet ook in aanmerking geneem word dat die sterftesyfers vir babas en jong kindertjies 'n groter daling toon as dié vir middeljariges en bejaardes.

In teenstelling met die daling in die algemene sterftesyfer styg die sterftesyfer vir bloedsomloopsiektes en kanker. Die toename in kransslagaarsiekte gedurende die afgelope kwarteeu verg die aandag van die mediese beroep. In die Verenigde State het die sterftesyfer vir mans in die ouderdomsgroep 50—65 in die afgelope 25 jaar meer as verdubbel en ander lande teken 'n stygende sterftesyfer vir kransslagaarsiektes aan. Die harte van meer as helfte van die Amerikaanse soldate wat op die slagvelde van Korea gesneuwel het, het tekens van verharding en vervetting van die slagaar getoon; hul gemiddelde ouderdom was 22 jaar. Op 'n onlangse mediese kongres het Braun [1] in sy presidentsrede die toename in kransslagaarsiekte in Suid-Afrika behandel. Hierdie toename vanaf middeljarige leeftyd dreig om die daling in sterftesyfers vir ander siektes te neutraliseer.

Soos hierdie feite meer terdeë besef word, word die aandag steeds meer op kransslagaarsiekte en sy oorsaak gespits. Professor Ancel Keys van die Universiteit Minnesota, 'n beroemde navorser op hierdie gebied wat al in baie lande ondersoek ingestel het en met baie ander navorsers saamgewerk het, doen op die oomblik navorsing in Suid-Afrika. 'n Verslag van die lesing wat

is at present working in South Africa, and a lecture he recently delivered in Cape Town is reported in this issue of the *Journal* (page 332). He states that apart from syphilis and other preventible infections it is generally agreed that coronary disease 'seldom develops except on the basis of atherosclerosis'. This is associated with an invasion of the intima of the artery by deposits of cholesterol, which comes from the blood, and 'the tendency to form atheromata is related to the blood concentration of cholesterol and cholesterol-bearing lipoproteins'.

The amount of cholesterol in the blood is shown to be mainly determined by the diet. At first it was supposed that the cholesterol in the food was the determining factor; but this was disproved and it was found that the concentration of blood cholesterol depended mainly on the amount of fat (vegetable as well as animal) in the diet. The explanation of this lies in the fact that fat, which is insoluble in the watery media of the body, is transported in the blood in the form of water-soluble lipoproteins, of which cholesterol is an important constituent. Keys' researches have applied to populations rather than individuals, and on this scale he has investigated the correlation between fatty diet, blood-cholesterol, and coronary disease. The fat in the average diet (expressed as the percentage of total calories that are supplied by fat) varies from 8% in Japan and 15% in the South African Bantu to 41% in the United States. In all the countries investigated, including also England, Sweden, Italy, Spain and others, it was found that a close correlation existed between diet-fat percentages, blood-cholesterol concentration, and the prevalence of coronary disease.

In certain countries the same correlation was found when working-class groups with low diet-fat were compared with the well-to-do classes; and it was also found in countries where as the result of the last world-war the fat in the national diet was temporarily reduced that the coronary mortality fell to a corresponding extent and increased again when diet-fat returned to normal.

Keys states that when the calorie-percentage of fat in the diet 'is less than 20% atherosclerosis is slight and coronary disease is rare; at 30-35% . . . . coronary heart disease tends to become the first cause of death for all ages over 40; and at 40% or more, coronary heart disease tends to become a veritable plague'.

It appears that obesity *per se* is of only secondary importance in relation to atherosclerosis. In the Italian population, where dietary fat, blood cholesterol and coronary disease are all low as compared with American and English populations, the people are as fat as the Americans and fatter than the English.

We are accustomed to the conception of poor diet as a cause of disease; now we are faced with a widespread disease that is the result of richness of diet. Further research into the problem is needed; for instance, the disparity between the sexes in regard to coronary disease has still to be explained. But the striking results that research has already provided give good reason to hope that in dietary control methods may be found of reducing the serious menace of coronary disease.

1. Braun, L. I. (1953): S. Afr. Med. J., **27**, 477.

professor Keys onlangs in Kaapstad gegee het, verskyn in hierdie uitgawe van die Tydskrif (bladsy 332). Hy verklaar dat afgesien van sifilis en ander voorkombare infeksies, dit algemeen aanvaar word dat kransslagaarsiekte '*seldom develops except on the basis of atherosclerosis*'. Dit gaan gepaard met die skending van die slagaarbinnevlies deur 'n neerslag van cholesterol wat van die bloed afkomstig is, en '*the tendency to form atheromata is related to the blood concentration of cholesterol and cholesterol-bearing lipoproteins*'.

Dit is bewys dat die hoeveelheid cholesterol wat in die bloed aanwesig is hoofsaaklik deur die dieet bepaal word. Die mening was eers dat die cholesterol in voedsel die bepalende faktor was; hierdie opvatting is egter weerlê en die konsentrasie bloedcholesterol hang hoofsaaklik af van die hoeveelheid vet (plant- of dier-) in die dieet. Die verklaring hiervoor is dat vet, wat nie in die waterige media van die liggaam oplosbaar is nie deur die bloed vervoer word in die vorm van lipoproteïene (wat in water oplosbaar is) waarvan cholesterol 'n belangrike bestanddeel uitmaak. Keys se navorsing het volke eerder as individuele geraak, en op hierdie grondslag het hy die verband tussen 'n vetterige dieet, bloedcholesterol en kransslagaarsiekte bestudeer. Die vet in die gemiddelde dieet (uitgedruk as dié persentasie van die totale kalorieë wat deur die vet voorsien word) wissel van 8% in Japan en 15% vir die Bantoe in Suid-Afrika tot 41% in die Verenigde State. In al die lande waar ondersoek ingestel is, o.a. Engeland, Swede, Italië en Spanje, bestaan daar 'n noue verband tussen dieetvet-persentasies, bloedcholesterolkonsentrasies en die voorval van kransslagaarsiekte.

In sekere lande bestaan daar dieselfde verband tussen die arbeiderklas wie se dieet min vet bevat en die meer gegoede klasse; in lande waar die vet in die volksdieet—as gevolg van die tweede wêreldoorlog—tydelik verminder was, het kransslagaarsiekte tot dieselfde mate afgeneem, en toe die vet in die dieet herstel was, het kransslagaarsiekte weer toegeneem.

Keyes konstateer: '*when the calorie-percentage of fat in the diet is less than 20%, atherosclerosis is slight and coronary disease is rare; at 30—35% . . . . coronary heart diesease tends to become the first cause of death for all ages over 40; and at 40% or more, coronary heart disease tends to become a veritable plague*'.

Sover dit verharding en vervetting van die kransslagaar aangaan, blyk dit dat vetsug *per se* nie van primêre belang is nie. In Italië waar die vet in die dieet, die bloedcholesterol en kransslagaarsiekte laag is, in vergelyking met Amerika en Engeland, is die mense net so geset soos die Amerikaners en meer geset as die Engelse.

Ons is gewoond aan die stelling dat 'n swak dieet siekte veroorsaak; nou staar die feit ons in die oë dat ryk kos die oorsaak van 'n alombekende siekte is. Hierdie probleem vereis verdere navorsing; die verskil tussen die manlike en vroulike geslag wat hierdie siekte betref, wag nog op verduideliking. Die treffende feite wat navorsing alreeds aan die lig gebring het, gee ons goeie rede om te glo dat die ernstige bedreiging van kransslagaarsiekte deur geskikte dieetkontrole gestuit kan word.

1. Braun, L. I. (1953): S.-Afr. T. Geneesk., **27**, 477.

THE DURBAN OUTBREAK

It is a far cry from frigid Iceland to Addington Hospital on Durban's sunny South Beach. This association is evoked, however, by the outbreak among the nursing staff of the Addington Hospital of a disease which according to reports received apparently attacks the nervous system and bears a striking resemblance to a number of other outbreaks, the first of which occurred in Akureyri, in Iceland, in 1948.[1]

The Akureyri episode ('Icelandic disease' as[2]) was explosive as the Addington outbreak is reported to have been, and affected 465 persons or 6.7% of the total local population. Comparable outbreaks have been reported from Adelaide, South Australia,[3] from New York State[2], from the Whitley Hospital, Coventry [4] and from the Middlesex Hospital, London.[5] The Coventry outbreak and that at the Middlesex are of particular interest as they were also confined to members of the nursing staff. The Adelaide and Coventry outbreaks, like that in Durban, followed in the wakes of poliomyelitis epidemics.

In these outbreaks there is a variable prodromal stage with malaise, headache, sore throat or gastro-intestinal disorder and mild fever. After about a week the headache often increases and a stiff back and neck develop, without true rigidity. The patients complain of a heavy feeling in one or more muscle groups and often of difficulty in sitting up. Muscle pain is common and was a striking feature in the Middlesex outbreak. Paraesthesiae may occur in the affected limbs but, although muscle tenderness is marked, there are only slight changes in cutaneous sensibility. There is little more than mild paresis of the affected muscle groups, and tendon reflexes may or may not be diminished. Occasionally pyramidal-tract signs are seen. Cranial-nerve involvement is not marked; nystagmus, however, may occur and there was a high incidence of diplopia amongst the Middlesex nurses. Sphincteric disturbances are limited to difficulty in the initiation of micturition during the acute phase of the illness.

Laboratory investigations are not informative. No haematological abnormality has been found and, although a few cases from Akureyri and Adelaide did show mild pleocytosis or increased protein, most cases have normal cerebrospinal fluids.

The course of the disease is generally benign and no deaths have been reported. There is rapid initial improvement and most of the acute symptoms, including the paresis, subside within a few weeks. Further convalescence, however, is tardy; relapses may occur and lassitude, irritability and impaired concentration are persistent sequelae.

In each of the overseas outbreaks the early cases were thought to have 'atypical poliomyelitis'. Poliomyelitis or rather polio-encephalitis has been known to produce pyramidal-tract changes, cranial-nerve involvement and sensory or sphincteric disturbances.[6, 7, 8] A normal cerebrospinal fluid may also be found in the occasional case.[9] The very high attack-rate, however, and the very high incidence of these unusual features made this diagnosis most improbable. Careful investigation of the stools in the different outbreaks did not yield poliomyelitis virus nor was there any serological evidence of recent poliomyelitis infection.

Investigations for other known neurotropic viruses have been made but is has not been possible in these cases to demonstrate infection with lymphocytic-choriomeningitis virus nor with the viruses of St. Louis, Japanese B, Australian X, equine, lethargic or mumps encephalitis. Coxsackie virus produces meningitic rather than encephalomyelitic manifestations [10] but was suspected because of the striking muscle tenderness. Its presence, however, could not be demonstrated by the Icelandic, New York or Middlesex Hospital workers.

The cause of these outbreaks, therefore, remains obscure. The remote observer, however, may care to indulge in a speculative exercise and a number of theories are offered for consideration:

The character of the outbreaks makes a toxic cause most unlikely and some sort of infection must be sought. The clinical picture suggests a virus infection and it is probable that such an aetiological agent will be found here. Two of the overseas epidemics and the Durban epidemic have been closely associated with poliomyelitis outbreaks, and a causal connection is feasible. Is a mutational variant of the poliomyelitis virus responsible for the atypical syndrome? Or is the clinical picture modified by partial immunity in the host? May the disease be not directly due to poliomyelitis infection, but represent a nervous-tissue hypersensitivity to poliomyelitis antigen? Or is this indeed a new disease due to an as yet unidentified organism? The medical profession in this country and elsewhere will be most interested to hear the report of their colleagues, who have observed the Durban outbreak, which is published in this issue (p. 344). It is a summary of the clinical findings and does not include the detailed investigations that are in progress. In due course a detailed report will be published.

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ATHEROSCLEROSIS AND THE DIET*

ANCEL KEYS

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In the middle of the twentieth century all the world extols the marvels of the science and practice of medicine. Our steady progress is measured by the increasing expectation of life. In some of our most highly civilized communities the new-born baby has an average expectation of almost the biblical allotment of three score and ten years. In contrast are the estimates of half that life span for many populations in Asia, Africa, South America and the Near East. These are not racial differences for we too had similar poor expectations not so long ago. But, we say, our superior mode of life, industry and medical knowledge have made all the difference.

Actually, our triumphant progress towards better health and lower mortality has been uneven. We have made tremendous gains in the fight against infant and maternal mortality; tuberculosis and other communicable diseases are rapidly disappearing; the antibiotics have given us remarkable control over all manner of infections; and the surgeons are doing an amazing job repairing our mechanical defects and injuries. But our improved life expectation turns out to be very largely accounted for by a great reduction of deaths in infancy and youth. The gain for adults, particularly men, proves to be small.

If we make allowance for the lives saved by modern medicine and public health, we come to a startling conclusion. It is difficult to escape the suggestion that adult men in our so-called most advanced communities are little if any healthier than their grandfathers. They are certainly much less healthy than their wives if we measure the outcome in mortality. How can we explain this? Heart disease is the trouble.

DEGENERATIVE HEART DISEASE

The rise of heart disease to the dominant position it holds today is not merely a reflection of the increased average age of the population. The picture is much the same if we examine mortality rates at given ages. For example, I have just received the latest analysis of life insurance experience in the United States. I will give you the findings on white men aged 50-65, with the distribution of ages standardized to average 55 years. The total death rate from all causes in 1925 was 21·8 and in 1950 19·4. This nice little gain is more than accounted for by improvements in tuberculosis and influenza alone. But heart deaths rose from 4·5 in 1925 to 8·6 in 1950. Moreover, the death rate from heart diseases of infectious origin—rheumatic and syphilitic—decreased by 20% over this period. In other words, our age-specific mortality from the degenerative heart diseases, mainly coronary heart disease, has more than doubled. In the United States coronary heart disease is now our leading cause of death. Other countries with a high standard of living are showing the same trend. Our women are not immune but they apparently preserve their youth a little longer than the men; they also show up in the column of coronary deaths a few years later.

It has been suggested that our high adult mortality rate is a result of our success in preventing infant mortality. The weaklings, we might say, are preserved for death in early adult life. But I find it impossible to believe that infantile diarrhea and diphtheria can be a 'kill or cure' vaccination against atherosclerosis and coronary disease 50 years later. Or that, given a chance, tuberculosis kills the very men who are otherwise destined to die of a coronary occlusion. And I want to know why over half of the hearts of American soldiers killed in action in Korea show atherosclerosis definitely developing. The average age of these boys was 22.

Our exasperation with the coronary problem is increased by the fact that it is certainly not merely the result of age. At the same time, however, in this fact is our greatest hope. Men and women are not doomed to coronary heart disease merely because of the passing of years. This is the fact that has led us to study people in England as well as in America, in Spain, in Sweden and in several parts of Italy. This is the reason Mrs. Keys and I are in Cape Town, taking advantage of the co-operation of Professor Brock, Dr. Bronte Stewart and their colleagues.

In South Africa, and in many other places in the world, there are large populations who seem to be singularly free of atherosclerosis, even at advanced age. We want to study such people in the hope of learning how we too may eventually present the pathologist with aortas and coronaries to be proud of. My own generation, perhaps, is beyond redemption, but I firmly believe that the answer, its application and the reward in the next generation, can be assured by *research in the next few years.* It is even possible to hope that some of the atheromata many of us now hide can regress. The main clue, I think, is in the diet, but I do not deny other factors.

ATHEROSCLEROSIS AND BLOOD CHOLESTEROL

Now it is time to discuss the facts. It is agreed that coronary and related degenerative heart disease seldom develops except on the basis of atherosclerosis. I exclude, of course, syphilis and other infections that are now preventable and are, in fact, already becoming excessively rare as causes in many regions. And atherosclerosis is, by definition, the condition where the intima of the artery is invaded by deposits of cholesterol. It has

* An address delivered at the University of Cape Town on 11 March 1955. Professor Keys illustrated the address by many statistical tables, which are only briefly summarized in the paper as printed.

been argued that some fault in the arterial wall invites such deposits but whether this is true or not, the crucial facts are two: First, this cholesterol undoubtedly comes from the blood. Second, statistically, the tendency to form atheromata is related to the blood concentration of cholesterol and cholesterol-bearing lipoproteins.

This is to say that the composition of the blood plasma is a major determinant, though not necessarily the sole cause of atherosclerosis development, and that the cholesterol-bearing moiety of the plasma is the responsible factor. I do not propose to discuss here the relative merits of various measurements as indices of the atherogenic potential of the blood. These include the total cholesterol, the cholesterol-phospholipid ratio, the amounts of cholesterol, of amino nitrogen and of lipid in the beta lipoproteins, and the total amount of beta lipoproteins of given density estimated by flotation in the ultracentrifuge. All of these measures, statistically, have highly significant and similar value in distinguishing between coronary patients and clinically healthy controls and, I believe, in predicting, statistically, the likelihood of eventual coronary disease in groups of people. But it is quite clear that all of them fail, and to rather similar degree, to yield reliable predictions for individuals. In my own laboratory we currently measure total cholesterol and the cholesterol in the beta lipoprotein fraction as separated both by paper electrophoresis and by cold ethanol precipitation. For several years we also measured phospholipids and carried out the ultracentrifugal analysis so stridently advocated by Gofman. We have now abandoned these as laborious and costly elaborations that contribute little or no additional information for our purposes.

In the present lecture the discussion is concentrated on total cholesterol because most of the relevant data concern this factor. And the first problem is, *what controls the cholesterol concentration in the blood?*

Forty-five years ago it was shown that the blood cholesterol concentration in the rabbit is readily altered by adding large amounts of cholesterol to the diet. The chick, but not the adult chicken, is equally sensitive. The dog with thyroid function destroyed and fed colossal amounts of pure cholesterol sometimes responds similarly. The importance of the animal experiments is to show that in all species tried, if the blood cholesterol can be increased enough and maintained that way, atheroma will develop. These animal experiments also show that there are tremendous differences in cholesterol metabolism between species and that if we are to discover the effect of the diet on man, we must study man himself.

Dietary Cholesterol. First, let us consider dietary cholesterol. Cholesterol is contained only in foods of animal origin; the chief sources are egg yolks, milk and milk products, and meats. On the average, the man who eats eggs for breakfast ingests twice as much cholesterol as the man who eats a European diet but takes kippers or porridge instead of eggs. Hence it is easy to make an approximate estimate of the cholesterol in the diet.

In 5 years of diet surveys in Minnesota—all on upper-middle-class business and professional men of ages 45-60—there was no sign whatever of any relation between the quantity of cholesterol in the diet and the serum level of cholesterol. This was the case even in experiments with controlled diets with daily doses of cholesterol varying from zero to 30,000 and 60,000 mg.—20 to 40 times the maximum in any natural diet.

DIETARY FAT AND BLOOD CHOLESTEROL

But diet apart from cholesterol content *can* affect the blood cholesterol. In an early experiment in 2 brothers with abnormally high blood cholesterol (idio-hypercholaemia) and cholesterol deposits in the body, a diet of rice and fruit immediately brought the blood cholesterol down—it appeared that the blood cholesterol does respond to the removal of the *last scrap* of cholesterol from the diet. But when vegetable oils were added to the zero-cholesterol diet, in 2 weeks the blood cholesterol was back almost to its old 'high'.

This observation was followed by systematic studies all of which showed a big and fast fall in the blood cholesterol on zero-cholesterol and low-fat diets; but when fat (even vegetable fat) was added to the diet (replacing carbohydrate) the blood cholesterol rose in spite of the absence of dietary cholesterol. Next, men were given a constant controlled mixed diet containing 110 g. of fat per day, and it was always found that the blood cholesterol responded to a change in the amount of fat in the diet but never to the amount of dietary cholesterol. These results continued up to the maximum duration of the experiments—6 months. But we then wanted to know the very-long-range effect in men leading normal lives.

These questions could not be answered by laboratory experiments, and we therefore turned to the experiments of nature. We estimated in certain national population diet averages the percentage of the total calories in diet that was supplied by fat. It varied from 8% in Japan and 15% in the South African Bantu to 39 in Australia, 41 in U.S.A. and 45 in the U.S. Army. (In U.S.A. the fat in the diet is contained in the following articles of diet: fats and oils other than butter (43%), meat, fish etc. (21·9%), milk and dairy produce other than butter (18·5%), eggs (6·2%), butter (4·8%), other sources (5·5%)—total 99·9%.) In studies on population samples in England, Italy, Sweden and the United States a close correlation was found to exist between these diet-fat percentages and the average blood-cholesterol level in the different populations—both at the age of 25 years and the age of 50 years.

That the difference was not racial was indicated in various series. For example, in Spain the diet of the upper classes is about as rich in fat as that of U.S.A., whereas the poor working men have a diet poor in fat; the blood-cholesterol figures correspond. Nor is the difference due to different levels of physical activity—at least not in the main (there is some tendency for the blood-cholesterol value to be lower in men on heavy work). There is also evidence that when populations change their diets, the cholesterol follows suit. In Germany there was a great fall in diet fats after the war during 1946-47, and a high fat diet again in 1949. The figures for blood cholesterol in sample groups from different population class in Stuttgart corresponded. In these population surveys similar results were obtained

when beta lipoproteins were measured as well as the total cholesterol.

HEART-DISEASE STATISTICS

National Death Rates. The relationship was then considered between fats as percentage of calories in the diet and degenerative heart disease (angina pectoris, coronary heart, arteriosclerotic heart, chronic myocarditis, myocardial degeneration) as shown in national vital statistics. The comparisons made between Italy and U.S.A. were very complete, and they showed that the excess of U.S.A. over Italy in deaths from these degenerative heart conditions were not accompanied by any corresponding difference in the morbidity rates from cancer, nephritis, cirrhosis of the liver, *intracranial lesions of vascular origin* or *heart disease other than degenerative.* Moreover, an excess of degenerative heart disease in the U.S. accounts for the otherwise surprising fact that the mortality from all causes of men from 40 to 70 is higher in the United States than in Italy.

Life-Insurance Statistics. Last year a prominent life-insurance actuary made a comparison between Italy and U.S.A. based on the number of policy-holders and the deaths amongst them. The same excessive mortality from degenerative heart conditions was found in the U.S.A. as compared with Italy.

To exclude a difference in clinical diagnosis this aspect was carefully investigated by an international team of reliable clinicians, including cardiologists from the U.S.A. and Sweden as well as from Italy. It was found that the doctors of Italy were *not* missing coronary cases in in-patient, out-patient or domiciliary services and, moreover, there was no bias against the admission of coronary cases to hospital.

Hospital Records. Passing from death statistics to hospital records, it was found in Naples, Bologna, South Sweden, Boston and the Twin Cities (Minneapolis and St. Paul) that the cases of coronary disease expressed as a percentage of all hospital cases rose in proportion to the fat content of the diet.

Autopsy records have been similarly examined. The p.m. data from Italy are scanty, but good records are available from Japan. The percentage incidence of high-grade coronary sclerosis in Japanese postmortems (males) is 1 : 10 compared with Minnesota males; it is even 1 : 3 when compared with Minnesota females.

The whole picture of a relation between the percentage of fat in the diet and coronary sclerosis is consistent throughout the world. An interesting feature is that it is not dependent on the presence or absence of *obesity*. The Italians, with their low incidence of coronary disease, are as fat as the Minnesotans, and fatter than the English.

Other Factors than Diet. The question may be asked whether the differences between nations and population groups is concerned not merely with the diet but with the whole complex of genetic factors, mode of life, emotional life, etc. Bearing on this point are the variations in mortality from degenerative heart conditions which accompanied the changes in the amount of fat in the diet during or after the last war. Examination of the death rates shows that in the countries affected there was a fall in this mortality figure proportionate to the decrease in diet-fat, and a rise with the subsequent increase in diet-fat after the war. In Germany the change in organic heart disability was seen in both the *Arbeiter* and *Angestellte* ('white collar') classes but it was greater in the latter. The change was greater in males than females. It is found generally that the percentage difference between heart conditions in the sexes climbs with the proportion of fat in the diet. This fact suggests that the sex ratio of the circulatory-disease death rate might be used as a crucial statistic in this connexion.

CONCLUSIONS

In this short review of a very complicated problem and selections from a great amount of data I have given only samples of the large amount of evidence, all of which is consistent to date, from which the following conclusions emerge.

Atherogenesis is markedly affected by, though not completely dependent on, the concentration of cholesterol or the cholesterol-bearing lipoproteins in the blood plasma. The cholesterol in the beta lipoprotein fraction may be more important than that in the alpha fraction but the great majority of the cholesterol is in the beta fraction anyway, and so the total cholesterol is a good measure for statistical purposes.

We can state confidently that the most potent influence on the blood cholesterol and lipoproteins known is the diet. However, dietary cholesterol itself is unimportant for man in all conceivable natural diets.

Though obesity is detrimental to the diseased heart, the total calories in the diet, and their reflection in the resulting relative obesity of the body, are not of more than secondary importance *per se* in the development of atherosclerosis. But outstanding importance must be attached to the fat content of the diet, measured as the percentage of the total calories derived from fats. In populations, when this percentage is less than 20%, atherosclerosis is slight and coronary heart disease is rare. At 30 to 35% fat calories atherosclerosis becomes a major problem and coronary heart disease tends to become the first cause of death for all ages over 40. At 40% or more, coronary heart disease tends to become a veritable plague and to cancel all the other health gains of modern medicine and public health.

There is evidence that the habitual level of physical activity also influences the development of atherosclerosis, though to a smaller extent than the fat in the diet. I have not had time here to discuss this but the effect may be explained, possibly, without conflict with my theory. The greater average speed of the circulation in physical work and the more rapid use of the fat moiety of the lipoproteins for the immediate metabolism of the muscles should be noted.

Role of Cholesterol in Fat Metabolism. Now a last word as to why dietary fat exerts its controlling influence on the plasma-lipoprotein concentration. The key is, I think, in the fact that neutral fats and fatty acids are not soluble in water or in the aqueous medium of the body but lipoproteins are water soluble. The formation of lipoproteins in the body is, in fact, nature's answer

to the problem of how to transport the fats in solution in the watery system which is the animal body. And cholesterol is an essential ingredient of the lipoproteins; so if fat is to be transported cholesterol must be provided from somewhere. Cholesterol is synthesized in the liver, or it is discharged or degraded, according to the load of fat presented for transport. The proof of this is seen in several other situations besides those produced by changing the dietary fat. Complete fasting, for example, demands the mobilization of fat from the fat depots and its transport to all parts of the body where it must take over almost the whole burden of supporting the energy metabolism. And so it is not surprising that we frequently see the serum cholesterol rise in complete fasting. Another excellent illustration of this principle that the blood cholesterol concentration is a response to the load of fat to be transported is provided by the situation in kwashiorkor, which is unfortunately so common here in South Africa. The baby with kwashiorkor is admitted to the hospital with a grossly fatty liver and a low level of serum cholesterol. It is fed on skimmed milk, which contains no fats and very little cholesterol and this results in two things which are interdependent: the liver fat is removed and the serum cholesterol may rise very high during this period. In later recovery the serum cholesterol gets to normal levels, less than in the fat-mobilization period and higher than in the fat-stasis period before treatment.

The Future. There remains a great deal of research to be done and our answers as yet are rough and without adequate detail. But you may share with me the view that the road ahead looks bright and that we are not being unduly sanguine when we hope for the day when, by scientific adjustment of the diet and widespread public health application, we can control our most ominous current problem of health in a prosperous world.

Our current research here in Cape Town, will, I believe, make a definite contribution to this end. The essential pieces in this puzzle are being sought by close collaboration between Professor Brock and Dr. Bronte Stewart here, Malmros and Biörck in Sweden, Fidanza, Poppi and Postelli in Italy, Kimura and Kusukawa in Japan, Morris in England, Paul White in Boston and my team in Minnesota. Other medical scientists are cooperating in Guatemala and in Finland.

Tonight I have emphasized the fats in the diet as a major factor. So far it stands out as the most intriguing and the most hopeful clue. But we are also trying to give full consideration to other possibilities; physical activity (or the lack of it), smoking, and the stress of modern life, whatever that is. We have even given thought to alcohol. In comparing heavy drinkers with teetotallers the blood cholesterol values are found to be in conformity with the findings at post-mortem examinations of severe alcoholics. They may have 'knobs' on their livers, but their coronary arteries are usually an affront to teetotallers. This is one among many mysteries still to be studied.

SUMMARY

1. In spite of the lives saved by modern medicine and public health, it is difficult to escape the conclusion that adult men in America and other 'advanced' communities are little if any healthier than their grandfathers. The chief reason for this is degenerative diseases of the heart.

2. These diseases are the result of atherosclerosis of the coronary arteries, which is primarily dependent on a high blood content of cholesterol. And an important, if not the main, cause of high blood cholesterol is a diet containing a high proportion of fat. Both vegetable and animal fats are effective, though perhaps they are not identical in quantitative effect.

3. The amount of cholesterol in the diet has no bearing on the question. The reason why the amount of fat ingested affects the blood cholesterol is that the fats, which are insoluble in water, are conveyed in the blood in the form of soluble lipoproteins, of which cholesterol is an important constituent. The necessary cholesterol is readily synthesized by the liver.

4. Investigations are referred to—carried out in many countries—which substantiate these views. The answers as yet are rough and without adequate detail but there are good grounds for hope that by scientific adjustment of diet and widespread public health application coronary disease can be controlled.

THE USE OF HYDROCORTISONE BY LOCAL AND INTRA-ARTICULAR INJECTION IN A VARIETY OF COMMON ORTHOPAEDIC CONDITIONS

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The concept of altering the biochemistry and relieving pain in pathological joints and other tissues by intra-articular or local injection has always been an interesting one, and numerous substances have been used in the past.

Hydrocortisone is one of the more recent substances so employed and the results have been reported mainly in the American literature. In view of these reports a clinical trial with hydrocortisone in a variety of conditions was embarked upon, and this paper reports on the results of approximately 1,000 injections on 465 cases. It is based on the records of the Hydrocortisone Clinic at the Johannesburg General Hospital and on cases treated in private practice.

Hydrocortisone is a synthetic hormone, also known as (Kendall's) Compound F or (Reichstein's) Substance M. It is a distinct corticoid and differs from cortisone (Compound E) in that it has a more marked local anti-

inflammatory or decongestive effect at tissue-cell level. Its local effect was first studied by Leopold *et al.* in certain eye conditions, and by Spies and Stone on dermatological diseases. In 1951 Duff, Robinson and Smith reported that their results of intra-articular injection of Compound F supported the concept that adrenocortical steroids exert their favourable action in arthritis by a direct effect at connective-tissue cell level; and in addition to suppressing inflammatory changes, they influence the altered chemistry of connective tissue toward a more normal pattern.

Hollander *et al.* compared the effects of cortisone and hydrocortisone by intra-articular injection of these substances into arthritic joints. They based their evaluation on the following criteria: (*a*) measurement of joint circumference, (*b*) tenderness, (*c*) range of joint motion, (*d*) synovial cell count, (*e*) joint temperature. They concluded from their experiments that hydrocortisone exerted a constant anti-inflammatory effect on rheumatoid joints when administered locally, whereas cortisone did not. The intra-articular joint temperature was lowered, the synovial cell-count decreased and joint movements improved. It was presumed that because hydrocortisone is 7 times less soluble in blood plasma than cortisone, it has a slower rate of dispersion, and this reservoir or depot effect enhances its anti-inflammatory potency above that of cortisone.

They conducted a survey of the effects of hydrocortisone when injected into rheumatoid and osteoarthritic joints and in several other conditions such as gout, traumatic arthritis and bursitis, and concluded that (1) the beneficial effect of hydrocortisone is non-specific, (2) it cannot be regarded as a cure, and (3) it temporarily suppresses the local reaction to an irritant.

The clinical improvement in the conditions treated with hydrocortisone has encouraged them to persist in this method of treatment and they have already reported the results of 10,000 injections into joints, bursae or tendon sheaths in 800 patients.

TECHNIQUE

Hydrocortisone acetate (hydrocortone, Merck) is a white crystalline power slightly soluble in water (1 mg. per 100 c.c.). It is prepared as a suspension in saline along with other suspending agents and a preservative. It is supplied in 5-c.c. vials as a sterilized suspension; each 1 c.c. equals 25 mg. Refrigeration is not necessary. The substance should not be mixed with saline, distilled water or other substances, since its state of suspension and effectiveness may be altered.

Mode of Injection. In arthritis hydrocortisone is injected into the joint cavity. This can be performed as an office routine if proper aseptic precautions are observed, but it should preferably be carried out in an operating theatre. The skin over the joint is prepared by cleaning it with a spirit or iodine swab; shaving is unnecessary unless the hair is profuse. The superficial tissues are infiltrated with 2 c.c. of 2% procaine as far as the joint capsule. The needle is left *in situ* and another syringe containing 1-2 c.c. of hydrocortisone is attached to the needle; by advancing the needle through the capsule and synovium, the joint cavity is entered and the required amount is injected into the joint. There should be no resistance to the depression of the plunger while the substance is injected. Occasionally a tag of synovium may block the tip of the needle and it is advisable to rotate the syringe as the injection is being made, so as to spray the solution into the joint. If the material is injected into the peri-articular tissues in error, the results will be unsatisfactory and there may be a subsequent painful reaction. It is essential to place the needle point in the joint cavity and a good knowledge of joint anatomy is therefore required. This method of treatment may fall into disrepute if true puncture of the joint is not carefully observed at each injection. Occasionally there is excessive synovial fluid present in the joint and puncture is then more certain and easy. The excess fluid should be aspirated and discarded before the injection of the hydrocortisone. Immediately after the injection, the joint is passively moved through its maximum range to disperse the hydrocortisone, and the patient is instructed to continue with his normal activities.

Site of Injection. In the knee joint the needle is inserted 1 cm. medial to the mid-point of the patella and advanced under the patellar articular surface.

In the hip joint the needle is introduced 2 cm. above the tip of the greater trochanter and advanced inwards until it strikes the mid-point of the femoral neck superiorly. It is then withdrawn for 2 mm. and the point of the needle should then be within the joint capsule. Another more successful route to the hip joint is to approach it anteriorly about 3 cm. below the anterior superior iliac spine and directing the needle towards the anterior aspect of the femoral head at right angles to the skin surface. The depth of penetration varies, but the point of the needle should be felt to contact bone and then be withdrawn 2 mm. before the hydrocortisone is injected.

The shoulder joint is reached *via* the anterior approach just lateral to the coracoid process.

The other joints are entered by their most accessible anatomical routes.

Amount Injected. The amount of hydrocortisone injected into the respective joints was as follows: hip joint 2 c.c., knee joint 1·5 c.c., shoulder joint 1 c.c., elbow joint, wrist 0·5 c.c. and finger joints 0·25 c.c. 'Tennis elbow' 1·5 c.c.

Frequency of Injections. In the series to be described, the injections were given at weekly intervals. In some cases one injection alone sufficed to relieve the pain, but in most cases further injections at weekly intervals were necessary. Maximum improvement usually occurred after the 3rd or 4th injection. Several cases of rheumatoid arthritis have had from 7 to 15 injections. In other conditions the method was generally discontinued and regarded as a failure if there was no improvement after the 4th injection. Patients were emphatic that the mild discomfort of the injection was worth while because the relief obtained was frequently so dramatic. Many have persisted in reporting back for their weekly 'joint lubrication', as they termed it, because it was the best treatment they had so far experienced for the arthritis.

Side Effects. The action of hydrocortisone is entirely local on the joint. Its mode of action is not entirely

understood, but there are definitely no systemic disturbances when injected intra-articularly. Occasionally a patient complains of a burning discomfort and a fullness of the joint a few hours after the injection, and some actually develop a joint effusion for 2 or 3 days. There is occasionally increased redness and heat, but this usually passes off in 48 hours. No case of osteomyelitis or suppurative arthritis occurred in this series.

Hydrocortisone should not be injected into joints affected by some specific infection such as gonorrhoea or tuberculosis.

Conditions treated. Hydrocortisone has been employed in this series for a period of 2 years, during which time 465 cases were treated, receiving a total of approximately 1,000 injections.

	Number of Cases	*Number of Injections*
Osteo-arthritis and degenerative arthritis	121	308
Rheumatoid arthritis	59	187
Gout	19	25
Bursitis	12	19
Supraspinatus tendinitis and 'frozen' shoulder	28	68
'Tennis elbow'	56	100
Tenosynovitis and De Quervain's disease	21	25
Knee operations	40	40
Manipulations of joints	20	25
Chronic sprains and joint effusions	39	78
Ganglion	5	7
Dupuytren's contracture	3	6
Fibrositis	15	30
Trigger finger	5	10
Painful heel	16	40
Hallux rigidus	3	6
Alkaptonuric arthritis	1	15

RESULTS

The follow-up period has varied from 1 week to 18 months. Most cases were seen at weekly intervals for 2-3 months after cessation of their treatment. The assessment of results of treatment in these cases is always difficult; the patients were asked to tell in their own words what percentage of improvement, if any, they themselves noticed in their joints. Most were intelligent adults and their own personal assessments were coupled with the results of the clinical examination of joint circumference, measurements of joint movements and skin temperature, in order to obtain some idea of the effect of this form of treatment. While this method does not give an accurate scientific estimation, it is held to be quite as good as any of the methods of assessment at present available.

1. *Osteo-arthritis and Degenerative Arthritis*

The joints treated included the hip, knees, shoulder, elbow, wrist, acromio-clavicular, temporo-mandibular, ankle, fingers and toes.

In 75% of cases the results of treatment were satisfactory to the patient and to the clinician, in that pain and swelling subsided completely and there was some slight improvement in joint function. Pain is usually the main presenting symptom and is more frequently relieved than the swelling. When there is gross diminution of joint function, movement is not as a rule markedly improved by hydrocortisone.

The first injection usually relieves 50% of the pain and 2 subsequent injections at weekly intervals generally suffice to rid them of the other 50% of the discomfort. In some cases the results are much more dramatic, and one injection has sometimes been sufficient to give relief for periods up to 12 months. The effect of hydrocortisone is extremely capricious and unpredictable, affecting different individuals and different joints in a varying manner.

Approximately 25% of the patients received no relief whatsoever even after 5 or 6 injections. However, none of them have been made worse. Hip joints particularly respond in a most erratic manner, and on the whole the results of injection into these joints were unsatisfactory. This can be ascribed to the difficulty in placing the hydrocortisone accurately within the joint cavity, and also because most of these patients first presented themselves for treatment when advanced bony and articular damage was already present in their hips. More knee joints were treated for osteo-arthritis than any other joint and it is in these that the most gratifying results were obtained. The pain and swelling was often diminished even after the first injection and in many cases further injections were unnecessary. It must be stressed that an inadequate puncture of the joint is liable to give poor results and this method of treatment should not be discarded until a satisfactory injection into the joint cavity has been made.

Ten cases of shoulder pain due to acromio-clavicular arthritis were all relieved. Two of these cases had previously received hydrocortisone directly into the shoulder joint, until it was realized that it was actually the acromio-clavicular joint that was the cause of the discomfort. They had instant relief after the first injection into this joint. Of these cases, 3 have subsequently had an operation for excision of the outer 1 inch of the clavicle, for recurrence and persistence of pain.

Osteo-arthritic fingers with Heberden's nodes were relieved of discomfort in 75% of cases after 2-3 injections of 0·25 c.c. of hydrocortisone into the terminal interphalangeal joints.

Four cases of temporo-mandibular joint arthritis were all relieved of pain for periods up to 12 months.

Three attempts at relieving backache due to degenerative arthritis of the paravertebral joints at the lumbosacral level failed, probably owing to the difficulty of entering these joints satisfactorily with the needle-point.

These findings indicate that hydrocortisone by injection should be prescribed in osteo-arthritis and degenerative arthritis particularly in an acute or sub-acute 'flare-up' of the joint, and in which other methods of treatment have failed or are not feasible. The patient should be warned that it is not a cure and the results are unpredictable, and that several injections may be required before any relief is obtained. In 75% of cases a satisfactory result can be expected if the injection has been satisfactorily made within the joint cavity.

2. *Rheumatoid Arthritis*

In this condition the general physical management of the case, together with the systemic administration of

cortisone or corticotropin, is still the most important aspect of treatment. Hydrocortisone can be used in the following instances:

1. where only one or 2 peripheral joints are involved;
2. where cortisone is contra-indicated because of hypertension, cardiac decompensation, nephritis, diabetes, tuberculosis, or peptic ulcer;
3. where cortisone or corticotropins have been successful on most of the joints, but one or 2 joints are still unrelieved of pain and swelling;
4. when manipulative procedures are performed on rheumatoid joints to correct contractures.

The value of hydrocortisone injections into these joints is probably attributable to the relief from pain experienced soon after the injection because, when the pain is relieved, muscle spasm is diminished and the patient is able to commence active exercises and thus 'build up' his muscles. Stiffness, contractures and muscle wasting can therefore be counteracted.

The rheumatoid joint is frequently swollen and injection is therefore a simpler procedure. Some of the fluid can be aspirated to relieve joint tension. Hydrocortisone can be mixed with a small amount of this fluid in the aspirating syringe before injection, resulting in better dispersal within the joint cavity.

The results of treatment in rheumatoid arthritis have been less satisfactory from the point of view of prolonged local relief of joint pain than in osteo-arthritis. In 75% the swelling diminished and pain subsided, but for only a brief period of 4-5 days. In osteo-arthritis the pain was relieved for a longer period; injections therefore had to be made at much more frequent intervals than in the latter condition. In only 10 cases were the joints rendered free of fluid and pain for periods of up to 3 months. However, even the short respite from pain between the injections enabled these patients to exercise their stiff joints and muscles, thus obviating contractures and muscle wasting. The patients themselves were only too eager for repeated injections, for the evanescent relief was much greater than that experienced from any other pain-relieving drug which had previously been administered to them.

In rheumatoid arthritis it is easier to assess results of treatment in an objective manner because diminished joint temperature, subsidence of joint swelling and relaxation of muscle spasm can be measured more accurately. In 58% of cases of this series these symptoms were improved by hydrocortisone, but the improvement was not sustained despite repeated injections.

Whilst no permanent success can be attributed to intra-articular hydrocortisone in this small series of cases, it is felt that a place for this method of treatment can be found, particularly if the indications previously mentioned exist.

3. *Gout*

All the cases of gout had received some other form of treatment during their acute attacks but they still had chronic unrelieved pain in one or other joint.

A dramatic response with complete relief of pain after one injection of hydrocortisone was experienced in 12 cases with painful knees.

Two cases with chronic painful metatarso-phalangeal joints were entirely relieved after one injection.

Two hip joints responded poorly, in that the pain only subsided for 4-5 days and then recurred. Subsequent injections did not give a favourable response.

One wrist joint was completely relieved after 2 injections.

One case with a tender painful gouty tophus at the insertion of the ligamentum patellae was instantly relieved of his discomfort.

From these results one gains the impression that hydrocortisone is an extremely useful adjunct in the treatment of gout localized to one particular joint.

4. *'Tennis Elbow' Syndrome*

This condition yielded the most spectacular and most constant results to hydrocortisone injections. Here the material injected was not always placed intra-articularly, but into the lateral ligament of the elbow joint or into the extensor muscle origins at the level of the lateral epicondyle. The site of maximum tenderness was determined, and 1 c.c. of procaine injected into the skin and subcutaenous tissues. Multiple punctures were then made in a radiating manner in the soft tissues, ligament and muscle origins in the vicinity of the external epicondyle, in order to ensure a wide diffusion of the hydrocortisone. (In some cases hyaluronidase was added to the procaine to assist in this spreading effect.) Hydrocortisone, 1—1·5 c.c., was then injected into the tender soft-tissue area, and the patient was advised to use his arm in a normal manner and even to partake of sport if he so desired.

In 50% of cases only one injection was required to relieve the symptoms completely; 30% were relieved of their discomfort after 2 or 3 injections, and 20% were failures in this series, even after 4 injections. Three of these cases subsequently underwent operation, and on exposure of the extensor muscle origins at the lateral epicondyle, a hard fibro-cartilaginous nodule was demonstrated in the common tendon origin which could obviously not have been relieved by any form of treatment other than excision. In 2 of them a small milky fluid collection was present in the interior of the fibro-cartilaginous nodules. Operation resulted in prompt relief of symptoms in each case.

Five cases experienced a mild recurrence of their 'tennis elbow' symptoms 3-6 months after their last injection of hydrocortisone, but they have been relieved by subsequent injections.

A control series of 10 cases with 'tennis elbow' symptoms were treated by procaine injections alone. One of these experienced permanent relief, whilst the others were not alleviated except during the 12-24 hours immediately after the injection.

5. *Supraspinatus Tendinitis and 'Frozen Shoulder'*

These patients were divided into 3 categories:

(*a*) *Acute supraspinatus tendinitis with or without a radiologically-seen calcific deposit.* Fifteen such cases were treated by injection of hydrocortisone into the most tender spot over the greater tuberosity, with instant relief. In 3 of them X-rays taken 4 weeks later showed complete disappearance of the radio-opaque material

in the supraspinatus tendon. It is difficult to determine whether hydrocortisone or the mere puncture of the degenerated tendon with the needle was the cause of the dramatic subsidence of symptoms. In the past similar results have been obtained with procaine infiltration alone.

(*b*) *Chronic painful shoulder joint with a large calcified mass in the vicinity of the greater tuberosity.* Six of these cases were treated by hydrocortisone injections into and around the calcified mass. Each case received 5 injections at weekly intervals, with relief of pain in one case after a follow-up period of 6 months, and very little relief in the other 5 cases.

(*c*) '*Frozen shoulder*' *syndrome.* Seven cases were not relieved at all, even after 4 or 5 injections at weekly intervals into the shoulder joint and the surrounding soft tissues. There were, however, 6 cases (included elsewhere in this paper) who were suffering from 'frozen shoulder' symptoms in which manipulation of the shoulder under general anaesthesia was performed, followed by injections of hydrocortisone into the joint whilst the patient was still under the anaesthetic. In these the results were much more satisfactory and pain was far less than in those patients who only underwent manipulation. Movements were improved because of the diminished pain and because active exercises could be performed immediately after the manipulation.

6. *Bursitis*

The 12 cases were as follows: prepatellar bursitis 5 cases, bursa anserina 1 case, olecranon bursitis 5 cases, subdeltoid bursitis 1 case.

In each case the bursa was aspirated and 1 c.c. of hydrocortisone injected. A crape bandage was applied to compress the bursa. One, or at the most 2, injections were necessary to prevent recurrence. All these cases were cured by this method.

7. *Knee Operations*

In 40 cases, hydrocortisone, 1 c.c., was sprayed into the knee joints with a syringe at the conclusion of such knee operations as meniscectomy, synovectomy and patellectomy. The post-operative morbidity was markedly diminished in all these cases and effusions rarely occurred. This procedure has now become a routine one and can be recommended.

8. *Chronic Ligamentous Sprains and Joint Effusions*

The cases treated were particularly sprains of the collateral ligaments of the knee joint accompanied by effusion, and also sprains of the elbow and ankle joints. The effusion disappeared rapidly and pain was markedly reduced on intra- and peri-articular injection. Chronic finger sprains were particularly amenable to intra-articular injection of hydrocortisone, and several boxers and labourers were speedily relieved of their discomfort.

9. *Fibrositis*

Although hydrocortisone is not specifically recommended for intramuscular injection, a number of cases in which no other diagnosis but fibrositis could be made were subjected to hydrocortisone infiltration of the tender palpable nodules. Most of these cases suffered from pain in the scapular and gluteal regions. Approximately 0·5 c.c. was injected in a radiating manner into the nodule after multiple punctures with the needle had been made.

In a series of 15 cases receiving a total of 30 injections, approximately 40% were relieved of their acute discomfort. The other 60% were unaffected.

10. *Tenosynovitis and De Quervain's Disease*

Those cases suffering from tenosynovitis of tendons either around the wrist joint, the fingers or the ankle joint were treated by injection of 0·5 c.c. of hydrocortisone into the palpable fluid swelling. There was marked improvement in all cases. In 5 cases of De Quervain's disease (tendovaginitis stenosans) of the thumb tendons treated by infiltration of the thickened tendon sheath with 0·5 c.c. hydrocortisone, relief of pain was obtained in 3 cases. Five cases of trigger finger due to stenosing tendovaginitis were injected, with temporary relief of pain for a few days but without any permanent relief of the disability.

11. *Joint Manipulations*

In 20 cases in which joint manipulations were performed under general anaesthesia, hydrocortisone was injected into the affected joint immediately after the manipulative procedure. The purpose was to relieve pain and muscle spasm and prevent further joint adhesions. Included in this series were cases of 'frozen shoulder', rheumatoid contractures, and contractures following decubitus and poliomyelitis. Results were encouraging in that the patients were much more comfortable after the manipulation; particularly in the 'frozen shoulder' group it was noted that greater mobility was regained, with less pain than in those cases in which manipulation alone, or hydrocortisone alone, was employed.

12. *Dupuytren's Contracture of the Fingers*

Three cases received a total of 6 injections of 0·25 c.c. of hydrocortisone into the thickened palmar fascia, without any relief.

13. *Painful Heels*

This obstinate condition, which often persists despite all measures for relief, was treated in 16 instances with injection of hydrocortisone into the tender area (usually situated at the attachment of the long plantar ligament to the under surface of the calcaneum.) In 10 cases the symptoms disappeared after an initial 48 hours of increased discomfort. Six other cases were not improved.

14. *Ganglion*

Three ganglia on the dorsum of the wrist and 2 on the dorsum of the foot were injected with 0·5 c.c. of hydrocortisone. A definite reduction in the tenseness of the swellings was noted, but the lumps did not disappear, despite repetition of the injections. The patients, however, expressed satisfaction with this form of treatment, possibly due to the diminution of pain because of the reduced tension within the ganglion.

15. *Hallux rigidus*

Three cases of hallux rigidus received 2 injections each into the metatarso-phalangeal joints. The patients maintained that the acute pain had been relieved temporarily, but movements were unaffected. Because of

the recurrence of pain, 2 of these cases subsequently submitted themselves to operation.

16. *Alkaptonuric Arthritis*

One case suffering from alkaptonuric arthritis of almost every joint in his body, submitted himself to a total of 15 injections of hydrocortisone into his knees, elbows and shoulder joints. He stated emphatically that this was the best form of treatment he had so far received, and he is still reporting back at intervals for repeated injections when the pain becomes severe. The periods of relief from pain after the hydrocortisone injections vary from 3 to 10 weeks.

17. *Miscellaneous Conditions*

Several patients suffering from conditions such as plantar warts, painful superficial scars, amputation-stump neuromata, plantar fasciitis of the foot, and peri-articular rheumatoid swellings, have also been treated, with relief in approximately 50% of cases.

CONCLUSIONS

1. Hydrocortisone is a useful adjunct to general measures in the treatment of rheumatoid arthritis, osteo-arthritis and gout. Its beneficial effect is non-specific and it cannot be regarded as a cure for these conditions.

2. In certain localized conditions such as traumatic ligamentous lesions, bursitis, tendinitis and 'tennis elbow' syndrome, it has in a high percentage of cases been successfully employed alone.

3. It has proved useful in certain orthopaedic procedures, e.g. after operations on joints, and in the rehabilitation of cases suffering from joint contractures and deformities.

4. The treatment is harmless and no severe toxic effects have been noted, despite repeated injections.

5. Hydrocortisone has not been found to be very effective in Dupuytren's contracture, ganglion, fibrositis, trigger fingers, or hallux rigidus.

I wish to express my gratitude to the Johannesburg General Hospital for facilities granted for treatment of many of these cases; and also to the Orthopaedic Registrars, Drs. H. Goldman and R. Douglas, for their assistance in keeping the records.

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ASTHMA IN CHILDHOOD*

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The cure of asthma is still beyond the reach of most medical practitioners and to many it is a frustrating fickle disease which demands much time and gives little reward. The flush of success in a particular case is often followed by the pallor from a night's vigil at an asthmatic's bedside, and therapy resolves itself into administering symptomatic relief. Various cough mixtures, tablets, vaccines and courses of injections are tried and in time the patient drifts on to another practitioner, also without success. The hospital out-patient department follows and fails, and the patient continues the rounds of doctor, chiropractor, herbalist and dietitian.

It was at the out-patient department of the Children's Hospital, Addington, that I realized the extent of the problem of asthma, which we think is particularly prevalent in Durban, where humidity, heat, intestinal parasites and pollens from tropical foliage have all been incriminated, but without proof. Many cases presented themselves at the hospital, and the therapy was largely symptomatic. Because of lack of time a rapid history would be recorded, a few investigations instituted, some tablets and a cough mixture prescribed, and a few pious words of advice offered. As like as not when the patient returned, a different, but also busy, doctor would see the case; he would announce the negative results of the tests and repeat the previous prescription. It was decided 2½ years ago to establish an asthma clinic where patients would be seen at leisure and by appointment and careful attention given to the patient, his disease and his environment. The results and conclusions drawn are now to be reviewed but let me say at once that there is really nothing new to offer and certainly no wonderful cure. It is felt, however, that real facts are worth repeating, especially if they have become lost in a multitude of theories and therapies. The approach has been purely clinical and can be carried out by any general practitioner who takes an interest in the patient and secures the confidence and co-operation of the parents. No elaborate techniques have been necessary and the psychiatric department has not been burdened. Statistical evidence will not be led.

Methods and Material. Most of the patients were referred from the medical out-patient department and only a few direct from general practitioners. Of the 60 original cases seen, 38 have been followed up for a year or more. Of the 22 cases remaining, 5 came only once and 17 others only 2 or 3 times, either because of

* A paper presented at the South African Medical Congress, Port Elizabeth, June 1954.

the lack of immediate results or dissatisfaction with the treatment. Six others of the 60 are known to have moved away from Durban. I have personally seen and followed up all the cases. At the first interview a very full and comprehensive history was taken, a complete examination made and routine tests instituted, as follows: X-ray of lungs (also of sinuses in patients over 4-5 years of age), complete blood count and Wasserman test, 3 stool examinations, a nasal smear for eosinophils, and a tuberculin patch-test. Skin tests for inhalants and suspicious foods were performed as a routine in the early days of the clinic, but this procedure was soon abandoned. A clinical assessment of the condition was made and treatment given accordingly. This always included breathing exercises (which are taught in a class at the physiotherapy department), advice to the mother on her attitude to the patient and the disease, and some anti-asthmatic drugs such as ephedrine, aminophylline, benadryl and benecardin, alone or in combination. Patients were seen as often as was possible and deemed necessary, usually every 2 or 3 months.

ANALYSIS OF 55 CASES

In 8 cases there was a history of domestic strife and it is noteworthy that none of these cases improved very much.

There was a strong history of asthma in the family in 20 cases while 13 others gave a positive family history of some allergy.

The white-cell counts were seldom raised, without a definite cause being found, but there were a few exceptions. An absolute eosinophilia was usual but it was not high (see Fig. 1). In one case the very high eosinophilia of 80% was proved to be due to the Katayama syndrome or invasive phase of bilharzia. Apart from this case, and a few others in which the eosinophils ranged between 25% and 33%, the majority had a mild eosinophilia only. The graph shows that the presence of ascaris lumbricoides ova in the stools had no obvious influence on the eosinophil percentage. Table I shows the usual sex incidence.

TABLE I. SHOWING AGE AND SEX INCIDENCE AND DURATION OF DISEASE

Age	*Female*	*Male*	*Average Duration of Disease*
0— 3 years	4	7	17 months
4— 6 years	9	14	27 months
7— 9 years	1	13	4½ years
10—12 years	2	5	5 years
Total	16	39	

Allergic rhinitis is commonly associated with asthma and is often the trigger that sets off an attack. Of 41 cases in which nasal smears were examined an excess of eosinophils was found in 22.

At least 3 stool examinations were done in each of 51 cases and of these 12 showed *Ascaris lumbricoides* ova, 3 *Giardia lamblia*, 1 *Schistosoma mansoni*, and 1 cysts of *Entamoeba histolytica*. Their presence did not aggravate the asthma nor did the asthma improve after treatment of the infestation. They seemed to have little bearing on the disease.

Treatment. An integral part of treatment is the taking of a very full history and enquiring into the domestic situation and possible precipitating factors, such as climate, exertion, presence of animals and house dust. The personality of the child and his place in the home and

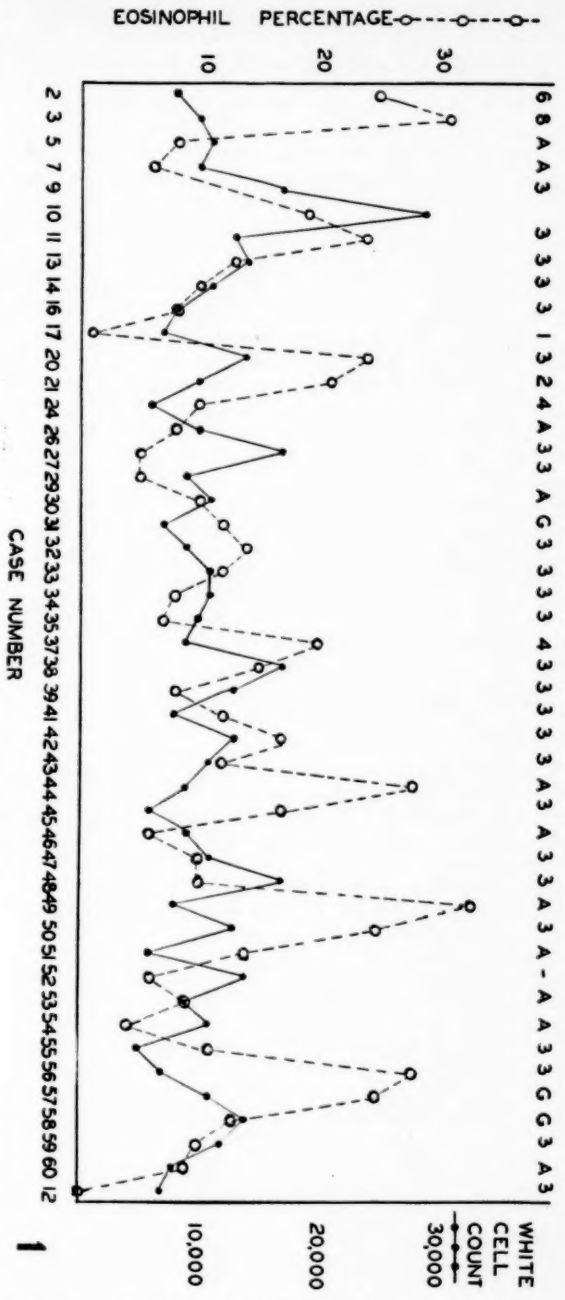

Fig. 1. A=Ascaris lumbricoides, G=Giardia lamblia.

relationship with siblings and parents is also measured. Often it is found that the child 'uses' his asthma and everyone gives in for fear of precipitating an attack. The mother becomes over-protective and puts him to bed at the slightest excuse, whether it be a running nose or just a cold day, and many days and weeks of school are missed. The dry irritating cough which is so typical and resounds through the house at night, becomes magnified and cough mixtures are used to no avail. Regularly the nights are disturbed and the sleeplessness and anxiety produce an irritable cross household.

At the clinic the parents are told that with their help and co-operation the number and severity of the attacks will be lessened but they are not offered a cure. I then add the hope that in time the child will 'grow out' of his trouble but that until then we must do all we can to ease and lighten the burden. They are usually very satisfied with this encouragement and once they have begun to come regularly, once they have attended the clinic 4 or 5 times, they are pleased to continue attendance. They have all been appalled at the recent suggestion that the clinic should be discontinued.

If allergic rhinitis is marked and acting as the trigger the child's bedroom is cleared as completely as possible of all dust-collecting articles. Curtains, carpets, furniture and toys are removed. The ideal is to have a bare room with just a bed in it so that the child sleeps in as dust-free an atmosphere as possible. An antihistaminic orally and as a nasal spray is usually prescribed too.

Breathing exercises are stressed and both children and parents are taught them so that they are performed regularly at home.

Specific therapy usually consists of ¼ gr. of ephedrine hydrochloride in elixir benadryl to 2 drachms to be given t.d.s. together with 1½ gr. of aminophylline at the same time. This is used for 2 weeks and then twice a day for 2 weeks and then at supper-time only; it is continued for months on end. Variations of this regime are used—aminophylline only or the ephedrine mixture alone—but it is stipulated that if an attack is thought to be imminent the full regime is brought into use immediately to try to abort it and is stopped after a few days if the patient keeps well. By this routine we have been able to abort many potential attacks. There are many other antispasmodics or combinations which can be used just as successfully, and no particular claim is made for those mentioned; it is their usefulness in prophylaxis that is stressed. Aminophylline is a great help. There are a few who cannot take it at all because it makes them vomit but, on the whole, children take it very well and in large doses. I seldom use less than ¾ gr. t.d.s. and 1½ gr. b.d. or t.d.s. is the usual dosage. This can be continued for months without ill effects, but after a time it is not usually necessary to give it 3 times a day; just at night is sufficient. We have seen some remarkable improvements in general well-being following this therapy. The parents are delighted with the improvement in behaviour, and especially in appetite, which is borne out by a substantial gain in weight. Many have gained as much as 4-5 lb. in 2 months.

Some patients who had already used an inhaler with some relief found that it could be discarded, while others still continued its use, which was not discouraged while it was of benefit.

Benecardin, 25 mg. b.d. or t.d.s., has been tried in a few cases with apparent success to begin with, but it soon loses its good effect. We use it now only if other antispasmodics have failed.

Hydrocortisone as a prophylactic in small doses daily has been used in one case only; whether this therapy is really justified is questionable, but it was a desperate method in a patient who was suffering repeated attacks each night, confining him to bed by day, making him disagreeable, irritable and crotchety. Now, after 2 months therapy, he is taking 2½ mg. twice a day, is very happy and a pleasure to live with, eats well and has gained weight; but still wheezes slightly at times. This the mother says is no disability.

When infection was present chemotherapy was instituted and in a few cases prophylactic sulphadiazine was used, but with equivocal results.

CASE REPORTS

Case 13. C.L., female aged 4 years, was first seen in April 1952 because asthma had started 1 year previously. There was no family history of allergies but possible precipitating factors were thought to be sudden cold weather, the change of the seasons and fear of a father who drank excessively. She was treated by the family practitioner with various medicines and improved for a period but then relapsed. Attacks occurred nightly, usually waking her with cough and wheezing followed by dyspnoea. On examination only allergic rhinitis was found to be present. Routine investigations were not helpful although skin tests showed strong reactions to feathers and house dust and a milder reaction to mixed compositae. She was given a mixture of ¼ gr. of ephedrine hydrochloride in elixir benadryl to 1 teaspoonful, together with 1½ gr. of aminophylline, t.d.s., and an antistine-privine nebulizer for spraying the nose. Breathing exercises were commenced and the child began to sleep on a porch which was made as free of dust as possible; the feather pillows were changed to kapok.

She improved slowly but still developed attacks, particularly on Saturdays and Sundays when father was at home. They were not as severe as previously and were controllable by the medicines. After 3 months the mixture was only used when necessary, but aminophylline was continued twice a day and later was used at night only. By the end of 1952 she was much improved and continued so in 1953, when only one severe attack occurred, necessitating an adrenalin injection. Mild attacks of irritating cough and wheezing occurred, which were easily controlled. It was at this time that the family moved to another house and the father's drinking spells were stopped because he was blacklisted. Improvement continued and for 6 months now prophylactic medicine has been used intermittently only and not regularly. The mother states that 'she is well and happy and a different child'.

Case 9. J.M., a male aged 7½ years, was examined first in April 1952. His asthma had begun 9 months previously, after an attack of bronchopneumonia. It always started with a cold, occurred every month and lasted 2 to 4 days. His mother was an asthmatic too and used an inhaler frequently; his sister had hay fever.

The domestic situation was unsatisfactory, as the mother was highly neurotic and under the care of a psychiatrist, while the father was old and in financial difficulty. The boy himself was mentally slow, somewhat stupid and in class I at a special school. Examination revealed a pallid, thin, flat-chested boy with a blocked nose. Wheezes were heard in the lungs.

Investigations were negative except that skin tests showed a +++ reaction to mixed grass pollens. He was given ephedrine and aminophylline prophylactically but was only slightly improved. He used an inhaler every night, had many severe attacks, some necessitating adrenalin injections, and once spent 2 weeks in hospital. Like all chronic cases he would improve and relapse at intervals. He would be worse during school holidays, on exertion, and in damp weather; and when his mother was about. She was obviously bad for the child, had no insight, and was overprotective. In

January of this year he entered the hostel of the special school and has not had an attack there; this despite all medicines being discontinued. He is happy and gained 6 lb. in 8 weeks. During this time he was allowed home for one week-end when, the mother states, he was chesty and asked for the atomiser which he used and soon fell asleep. Examination during this wonderfully good spell showed that his nose was still blocked and rhonchi were still heard on inspiration. His mother says that he is more obedient and is a nicer child.

Case 5. B.D., a male aged 3 years, began his asthma at the age of 2 years. Attacks occurred monthly but were weekly when first examined in March 1952; they lasted 2-3 days. There was no family history of asthma and no psychogenic disturbance. Apart from malaria he had had no serious illness, but an X-ray of the lungs 3 months after his first attack showed a right basal bronchopneumonia. This was still present 9 months later but it could not be detected on clinical examination, which was completely negative. Skin tests suggested a sensitivity to cheese and a test meal produced an attack. Cheese was eliminated from the diet, but without relief, and later when reintroduced it made no difference. Because of the persistent X-ray appearance in the lung bronchoscopy and bronchogram were performed, with negative results. The attacks persisted. A long stay in hospital for a surgical correction of a congenital deformity did not improve matters, although the episodes were not so severe. The condition persisted and in July, 15 months after the first examination, he suffered a particularly severe attack which did not respond to intravenous aminophylline.

He was taken away to the Drakensberg mountains, 4,000 feet above sea level and for 3 months was perfectly well, did not cough or wheeze, or need any medicine whatsoever. He gained 6 lb. in weight. Within 48 hours of returning to Durban both the cough and wheezes began again.

Case 59. T.H., a male aged 4, was first examined in September 1953 because of asthma of 2 years duration. The first attack began when the patient was sent away to stay with strangers because the mother entered a nursing home to be delivered of her third child. On returning home he was aggressive toward the new baby and the mother found him difficult. He had always been a thumbsucker and a 'hysterical type' and was regarded as the 'cuckoo in the nest'. At first his attacks occurred every 6 weeks but later weekly and even nightly, and despite all kinds of antispasmodics adrenalin injections were also necessary. Investigations were all negative; eosinophils were absent from the blood count and nasal smear.

Despite adrenalin, aminophylline, ephedrine, antihistaminics, benecardin, an inhaler, antibiotics and sedatives he continued to wheeze and cough and have asthma every night and sometimes in the day too. Hydrocortisone was started, 5 mg. 6-hourly slowly decreased over a period of 6 weeks to 2½ mg. b.d. During this time he changed completely and became a delight to live with, happy and smiling with a mild 'moon face'. No asthma has occurred, although he still wheezes at times, but this is no disability for he sleeps right through most nights. No complications of steroid therapy have occurred except for a full face, and he overcame an attack of influenza in a few days.

DISCUSSION

It has always been my custom when dealing with a case of asthma for the first time, to initiate the normal battery of tests immediately and include a series of skin tests—both scratch and intradermal—of the common allergens and any other particularly suspect. I have not found these to be very helpful and the few who were desensitized to house dust, mixed grasses or mixed compositae were failures. The paediatric text-books devote the greatest part of the portion on treatment to the various techniques for skin testing and desensitization, followed by detailed elimination diets; the psychogenic aspect of asthma is usually dismissed in half a page. We shared this point of view until it became obvious at the clinic that skin testing and dieting did not produce results, the psychological factors seeming to play the major part. Of course the constitutional factor is admitted, often in association with a strong family history of allergy, but psychogenic causes act as the triggers more frequently than allergens. In those cases where domestic stress was marked the results were poor but where these causes were absent and parents were interested and co-operative the results were good. It is not suggested that skin testing and dieting should be eliminated altogether but where they fail or if they are impracticable the basis for therapy is to obtain the goodwill and co-operation of the patients, to show a kindly interest in their problems, to offer advice, eliminate fears and obtain the confidence of the patient. To achieve this takes time and it is difficult for the general practitioner. So often parents are told that the child will grow out of it and they need not worry. They are not satisfied with this and find it most difficult not to worry while they watch their child struggling to empty his lungs; it is a frightening disease, especially in the dark dreary hours before dawn when attacks are all too common. If it happens nightly or weekly or even monthly they want some relief and regular reassurance.

Usually during an attack, and after much debate, worry, anxiety, fears and doubts, the practitioner is called out to give an injection which eases the attack and within a day or two the episode is over. Little is done by the doctor to come to grips with the disease. He 'pops' in to see the patient on a visit or two and then does not see him again until next an injection is needed. The child then will often associate the doctor with the needle and will fight and scream when he approaches; this excessive lung straining will certainly aggravate an attack; so may much laughing, coughing or strenuous exercise. It is contended that if, at this stage, an interest is shown and the patient's case history reviewed each month, severe attacks will be diminished. During these interviews all possible psychogenic factors can be examined and suggestions made as to clothing, diet and exercise. Breathing exercises can be re-stressed and normal behaviour on the part of mother and child examined. If there is no infection he must be allowed to go to school and must be kept out of bed unless really ill. The relationship between siblings, teachers, friends at school, and especially parents, must be examined regularly, since deviations so often start an attack. If the family doctor is not prepared to follow this regime he should hand the case over to one who is.

Allergic rhinitis was a persistent and recurring factor in 66% of the cases, usually preceding an attack and apparently acting as the precipitating mechanism. Often it is due to some inhalant allergen and often it is due to infection. Upper respiratory infections are well known to precipitate the sneezing or to occur as a secondary invader. Some authors such as Schick and Peshkin (1953) stress inhalant or food allergens as the principal trigger factor while others, particularly Chobot (1951), stress bacteria, but few emphasize the important psychogenic causes. These are common too and have been stressed recently by O'Niell and Malcolmson (1954), and Bakwin and Bakwin (1953). Even Lewis Carroll was familiar with this (although his advice is probably not

acceptable to the psychologists) when he wrote in *Alice in Wonderland*:

> 'Speak roughly to your little boy,
> And beat him if he sneezes;
> He only does it to annoy
> Because he knows it teases.'

SUMMARY

The reasons are given for beginning an asthma clinic at the Children's Hospital, Addington, and the results over 2½ years reviewed.

Those patients who attended regularly have been improved, some quite remarkably; this is thought to be due to the interest taken in the patient and his environment and the advice and reassurance given to the parents. It is suggested that the family doctor could do this.

This study confirms that psychological factors play a major part in asthma in children.

My thanks are due to Dr. J. Tanchel, Medical Superintendent, Addington Hospital, for the use of hospital records and permission to publish.

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MEMORANDUM ON THE OUTBREAK AMONGST THE NURSES AT ADDINGTON HOSPITAL, DURBAN

R. C. J. HILL, F.R.C.S. (EDIN.)

Chairman, Clinical Section, Investigating Committee, Durban

Since considerable press publicity, not always accurate, has been devoted to the distressing outbreak amongst the nurses at Addington Hospital, it may be of interest at this stage to present a short interim report on the position to date, as a guide to the detection of similar cases which might occur in other parts of the Union.

The outbreak commenced towards the end of a recognized poliomyelitis epidemic, but it does not bear more than a superficial resemblance to this disease. In many respects it resembles other outbreaks coinciding with poliomyelitis epidemics which have been reported in the literature.

At the time of writing there has been a total of 84 cases connected with the Nurses' Home at Addington Hospital. The disease has shown a marked predilection for the age-group 18 to 25 years, although some of the more recent cases have belonged to an older age-group. A point of interest is that the disease has not affected any other hospital personnel and, so far as can be ascertained, no ward patients.

The first nurse with signs of the disease reported sick on 8 February 1955, the second on 14 February. Thereafter, in the 7 days 18 to 25 February, no less than 59 cases occurred. This would appear to have been the 'explosive' period and since then the incidence has tended to be more sporadic. The pathogenesis of the disease is still in doubt but, assuming it to be infective in origin, it would seem that the incubation period is between 7 and 21 days.

Clinical Picture

It should be stated at the outset that there has been considerable variation in the severity of the disease. In some cases symptoms and signs have been minimal and recovery rapid; in others, the illness has proved extremely debilitating and protracted. In the majority there have been two distinct phases, viz. the prodromal phase and the acute phase:

(*a*) *Prodromal Phase.* Prodromal symptoms usually occur up to 14 days preceding the onset of the acute phase. They include the following: Headache, extreme lassitude, sore throat, sore eyes, nausea, vomiting, diarrhoea, backache, and coryza.

(*b*) *Acute Phase.* This is ushered in, often dramatically, by sudden weakness, and a feeling of heaviness in one or more extremities, predominantly on the left side. In most cases severe backache, headache and lassitude are present, whilst severe shoulder-girdle and subcostal pain are common features. Other symptoms are stiff neck, tingling in the extremities, and muscle cramps. Six cases have had bladder symptoms.

Physical Findings

General. A low-grade fever, not above 100° F, and not lasting more than 48 hours, is present in most cases. A few appear ill but, in the majority, systemic disturbance is minimal.

Special. There have been no signs of meningeal irritation, and no evidence of bulbar involvement. True neck rigidity has not been found. In a few cases a mild facial muscular weakness has presented, associated with a patchy diminution of sensation. Otherwise the cranial nerves are intact. A distinctive feature has been a marked disinclination or inability to sit up in bed,

due to pain and weakness in the back and abdominal muscles.

The most striking changes are found in the muscles of the affected limbs. Individual muscles or groups of muscles are extremely painful and tender on handling, and of a definite 'rubbery' consistency. Both proximal and distal groups are liable to be involved.

The affected muscles initially show a flaccid paresis, in which weakness is marked. Later the muscles become hypertonic, although a few progress to a true flaccid paralysis. In the hypertonic phase, although weakness is still severe, the muscles contract sluggishly. This pattern of contraction appears to be conditioned by pain and by failure of the opposing muscle-groups to relax. When tested against resistance, the muscles contract in a curious interrupted or clonic-like fashion. Initially the reflexes are depressed, but never absent. As the muscles become hypertonic the reflexes return to normal or, more commonly, become exaggerated. No other abnormal reflexes have been found.

Patchy areas of diminished sensation, which do not conform to any anatomical pattern, are usually found over the affected muscle-groups, but may occur elsewhere. In many, vibration and position sense is impaired.

Progress of Illness to Date

Severe headache has been a persistent symptom in many cases, even up to 4 or 5 weeks, and in some nausea and vomiting have continued. The persistence of these symptoms has seemed to indicate that the disease is still active and that further paresis may occur. In some cases weakness has spread to other muscle-groups, even after a lapse of several weeks.

Experience has shown that the hypertonic state of the muscles is aggravated by any form of activity and we would stress that physiotherapy is definitely contra-indicated. Attention to posture in bed, however, is important to guard against deformity. Where physiotherapy has been tried relapses have occurred or progress has been retarded. Day-to-day variation in the degree of paresis has been noted, but to date there has been no detectable wasting of the affected muscle-groups. Some degree of diminished sensation has tended to persist.

Management

This may be summarized as follows: Isolation for 3 weeks, complete bed rest, and control of posture in bed. It is a protracted and somewhat frightening illness, and constant reassurance and encouragement are important.

Special Investigations

The cerebrospinal fluid has been completely normal in all but a very small minority of cases, in which a slight increase in globulin was found. Repeat CSF investigations during the course of the illness have also been negative. Full haematological, biochemical, toxicological, and virus studies to date have all yielded negative results.

The electrical reactions of nerves and muscles have been examined, and the findings are being assessed. Muscle biopsies have also been performed.

Investigations are continuing in an endeavour to discover the aetiology of the disease, and to determine the precise site of the lesion.

OUTSIDE CASES

Twenty cases have been admitted to hospital from the Durban area, exhibiting a similar clinical picture and, since the attention of local practitioners has been drawn to the condition, other suspects have been reported. There are indications, also, that isolated cases may have occurred prior to the Addington outbreak.

RACE, SEX AND AGE

The outbreak being mainly confined to nurses, of the 104 cases 92 were females and 12 were males. The females were all of the child-bearing age, and no cases have occurred in children or in non-Europeans.

ANNUAL REPORT OF THE DEPARTMENT OF ANAESTHESIA, GROOTE SCHUUR HOSPITAL, CAPE TOWN, 1954

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and

A. B. BULL, M.B., CH.B.†

In this, the second annual report of the Department of Anaesthesia of the Joint Medical Staff of the Cape Provincial Administration and the University of Cape Town, we have extended slightly the scope of the analysis of the work done by the Department. In other respects the report does not depart to any extent from the form of the first report (see this *Journal*, 1954, vol. 28, p. 483). The emphasis in choice and conduct of anaesthesia continues to be placed on safety to the patient.

Staff. The Staff of the Department, particularly among the trainee members, was in a considerable state of flux during the year. The strength remained as before, with the addition, during part of the year, of an extra trainee assigned from another Department.

Organization. This remains largely unchanged. The Obstetrical Emergency Service has been extended to include the Obstetrical Division of the New Somerset Hospital.

Equipment and Drugs. It has been difficult to ensure regular and

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expert care and servicing of anaesthetic machines and oxygen-therapy equipment.

An Anaesthetic Record Card has been developed and introduced to improve the teaching of anaesthesia and record-keeping.

A system of cost accounting has been introduced and preliminary survey indicates a running cost of about 30s. per anaesthetic.

Teaching. Facilities for undergraduate and postgraduate teaching were extended and improved. A Winter Seminar Course was again held.

A Refresher Course in Anaesthesia, designed to assist general practitioners, was held during 12-15 April and from our point of view was eminently satisfactory. It is planned to make this a regular feature of our service.

Examinations for the degree of Master of Medicine in Anaesthesia were held in June and in November.

Research. During the year work was continued on studies of arterial oxygen saturation during anaesthesia and on carbon dioxide concentrations in the anaesthetic apparatus. Work was also undertaken to determine the possibility of using catheters tipped with radio-active cobalt and placed into the heart under Geiger counter guidance. The oxygen tensions in anaesthetic apparatus were studied and also the effect of analgesic drugs upon the respiratory minute volume. The effect of curarizing doses of gallamine triethiodide upon the electro-encephalographic records of anaesthetized human subjects was also studied.

ANAESTHETIC ADMINISTERED

The volume of work done during the year is indicated in Tables I, II and III and is compared with the figures for 1953. The total of 15,076 anaesthetics covers the work done in the Teaching Hospitals which we serve and shows an increase of only 0·7% in numbers. With the addition of 2,079 dental anaesthetics the grand total of 17,155 represents an increase of 6·3% over the figures for 1953.

In order to emphasize that numbers alone are not the true reflection of the volume of work done, Table III has been rearranged so that anaesthetics usually lasting over 1 hour are entered in the first column while anaesthetics usually lasting less than 1 hour are entered in the second column. This arrangement shows that there has been an increase of 19% in the anaesthetics of long duration and a decrease of 2% in the anaesthetics of shorter duration, a net increase of 17% in actual time occupied in the administration of the anaesthetic. If to this figure the 6% increase attributable to additional work in the Dental Clinic is added the net increase in volume of work done is of the order of 23%.

This very large increase was achieved in the face of considerable difficulty by constant efforts to improve the efficiency of the Department. The assignment of an additional anaesthetist from another Department was of very material value in this respect.

In Table IV are listed those deaths which fell within the scope of Section 86 of the Medical, Dental and Pharmacy Act, No. 13 of 1928. There were a total of 19 such deaths during the year, of which 9 occurred during the operative period. The remainder occurred at varying times in the immediate post-operative period, most of

TABLE I. TOTAL NUMBER OF ANAESTHETICS ADMINISTERED FOR SURGICAL, OBSTETRICAL AND MEDICAL PURPOSES (DENTAL ANAESTHETICS ARE EXCLUDED)

Year	*Total Anaesthetics*	*% Increase per annum*
1950	10,724	—
1951	11,891	10·8
1952	13,216	11·1
1953	14,966	13·2
1954	15,076	0·7

TABLE II. ANAESTHETICS ADMINISTERED FOR VARIOUS SERVICES

Theatre	1953	1954
General Surgery	4,499	4,449
Gynaecology	2,622	2,487
Obstetrical Service	—	292
E.N.T.	2,573	2,348
Casualty Surgery	1,943	2,035
Orthopaedics	1,621	1,598
Urology	674	606
Ophthalmology	455	506
Neurosurgery	411	593
Medical etc.	168	162
Total	14,966	15,076
Dental Extractions	1,179	2,079
Grand Total	16,145	17,155

TABLE IV. DEATHS

Died in the Operating Theatre		*Died Post-operatively*	
Age	*Operation*	*Age*	*Operation*
Adult	Strangulated hernia.	Adult	Strangulated hernia.
Child	Depressed skull fracture.	Adult	Forceps delivery.
Adult	Strangulated hernia.	Adult	Urinary extravasation.
Adult	Coarctation of aorta.	Child	Tonsillectomy.
Adult	Lumbar sympathectomy.	Adult	Forceps delivery.
Adult	Haematesis—gastric resection.	Child	Blalock operation.
		Child	Cardioangiography.
Adult	Pulmonary valvotomy.	Child	Patent ductus arteriosus.
Adult	Mitral valvotomy.	Adult	Urinary extravasation.
Adult	Caesarian section.	Adult	Pulmonary valvotomy.

TABLE III. ANAESTHETICS ADMINISTERED FOR VARIOUS TYPES OF SURGERY

Major Anaesthetics	1953	1954
Gastric resection	277	255
Biliary system	166	186
Large bowel and rectum	29	76
Cardiac	39	69
Other intrathoracic	81	66
Major jaw and tongue	14	31
Oesophagectomy	17	14
Intracranial	222	233
Other neurosurgical	189	360
Open bone operations	566	715
Mastoidectomy	91	116
Fenestration	5	4
Nephrectomy	42	34
Transabdominal urologic	191	148
Vesicovaginal fistula	28	38
Hysterectomy	318	336
Pelvic exenteration	—	28
Totals	2,275	2,709

Minor Anaesthetics	1953	1954
Plastic surgery	428	438
Sympathectomy	17	70
General surgery	3,431	3,244
Manipulations	1,055	883
Nasal sinuses	103	55
Tonsillectomy etc.	2,374	2,173
Ophthalmic	455	506
Bronchograms	72	75
Medical	96	87
Casualty	1,943	2,035
Transurethral	97	87
Other urological	344	337
Colporrhaphy	146	152
Caesarian section	237	277
Obstetrical	—	119
Other Gynaecological operations	1,893	1,829
Dental extractions	1,179	2,079
Totals	12,691	12,367

them within 24 hours of operation. As some of these deaths are still under magisterial review, details are omitted.

SUMMARY

A report, covering a total of 17,155 anaesthetics administered by the Department of Anaesthesia of the Groote Schuur Hospital and the University of Cape Town during the year 1954, is presented.

We are indebted to Dr. N. G. Cloete, Medical Superintendent of the Groote Schuur Hospital, and to the Dean of the Faculty of Medicine of the University of Cape Town, for permission to publish this report.

QUALIFICATION OF PHARMACISTS

RULES AND MINIMUM CURRICULUM FOR THE SOUTH AFRICAN PHARMACY BOARD'S DIPLOMA IN PHARMACY

The following Government Notice (No. 437 of 1955) has been published for general information by the Department of Health in the *Government Gazette Extraordinary* of 11 March 1955:

The Minister of Health, in exercise of the powers conferred on him by sub-section (4) of section 94 of the Medical, Dental and Pharmacy Act, 1928 (Act No. 13 of 1928), has approved of the following rules made by the South African Pharmacy Board under sub-section (2) of the said section of the Act:

A. As from 1 January 1955, the rules published under Government Notice No. 2643 of 1947, as hitherto amended, shall be applicable only to those students presenting themselves for the examinations held by the Board who, before the said date had been registered by the Board as apprentices under a three-year contract prescribed under section 27 of the Act and/or had entered upon the prescribed course of study at a training institution then recognized by the Board; provided that this provision shall cease to operate as from 31 December 1959, on which date the said Government Notice No. 2643 of 1947 shall be regarded as cancelled *in toto*.

B. The following new rules shall be applicable to all other students presenting themselves for examinations conducted by the Board, and to those students referred to in rule 1 hereof who, having been eligible to present themselves for examination in terms of the rules published under Government Notice No. 2643 of 1947, as amended, fail to pass such examination by 31 December 1959:

1. The period of study between the date of registration by the Board as a pharmacy student and the date of admission to the final examination for the Board's Diploma in Pharmacy shall be a total period of certified study of not less than three academic years excluding the period of apprenticeship.

2. No student shall be enrolled as a pharmacy student at a recognized training institution until he is in possession of a certificate of registration as a pharmacy student given by the Board.

3. No student shall be admitted to the course of study for the Qualifying Examination unless he has passed the examinations in all of the subjects of the Intermediate Examination or has been allowed a supplementary examination in one subject only.

4. The examinations to be held by the Board for its Diploma in Pharmacy shall consist of:—

A. The Intermediate Examination.
B. The Qualifying Examination, Part I.
C. The Qualifying Examination, Part II.

Such examinations shall be held once a year in the last quarter of the year, on dates to be determined by the Board, at centres to be determined by the Board where, in the opinion of the Board sufficient numbers of candidates will present themselves for examination and suitable laboratory facilities are available; provided that candidates who have failed in one subject only either in the Intermediate Examination or Part I of the Qualifying Examination may present themselves for re-examination in that subject at a supplementary examination to be held in April of each year at such centre or centres as the Board may determine, or at any subsequent examination conducted by the Board.

5. The scope of the examinations shall be in accordance with the syallabus set out in Appendix 'A' of these rules and candidates shall be examined in the following subjects:—

INTERMEDIATE EXAMINATION

Botany—Theory—3 hour paper.
Botany—Practical—3 hour paper.
Chemistry I—Theory—3 hour paper.
Chemistry I—Practical—4 hour paper.
Physics—Theory—3 hour paper.
Physics—Practical—3 hour paper.
Zoology—Theory—3 hour paper.
Zoology—Practical—3 hour paper.

QUALIFYING EXAMINATION, PART I

Physiology—Theory—3 hour paper.
Physiology—Written practical—2 hour paper.
Forensic Pharmacy—3 hour paper.
Pharmacognosy—Theory—3 hour paper.
Pharmacognosy—Practical—3 hour paper.

QUALIFYING EXAMINATION, PART II

Chemistry—Theory—Two 3 hour papers.
Chemistry—Practical—Two 6 hour papers.
Pharmacy—Two 6 hour papers.
Practical Pharmacy and Dispensing—Two 6 hour papers.

6. The course of study for the Intermediate Examination, Part I, of the Qualifying Examination and Part II of the Qualifying Examination respectively shall be one academic year of full-time study at a recognized training institution.

7. The examinations shall be conducted in each subject by at least two examiners, one of whom may have taken part in the teaching of candidates in the subject.

8. No candidate shall be considered as having passed an examination in any subject, unless he has obtained at least 40 per cent in both the practical and the written papers and an aggregate of at least 50 per cent for both papers in the subject. In the case of pharmacy and dispensing he must have obtained at least 60 per cent in the practical paper and 50 per cent in the written paper.

INTERMEDIATE EXAMINATION

9. No candidate shall be admitted to the Intermediate Examination unless he has been registered as an apprentice under a contract registered by the Board in terms of the rules relating to apprentices published in terms of section 94 (2) (*i*) of the Medical, Dental and Pharmacy Act, No. 13 of 1928.

10. A candidate desiring to enter for the Intermediate Examination shall apply in writing to the Registrar of the Board . . . .

The application must state . . . . the name of the recognized training institution at which the candidate underwent his studies . . . . and must be accompanied by—

(*a*) a certificate from a recognized training institution that the candidate attended at least 80 per cent of the classes of a full-time course of study covering one academic year;
(*b*) a statement giving the number of his certificate of registration as a pharmacy student or proof of having been exempted from such registration;
(*c*) the examination fee of £6 6s.

If a candidate served his apprenticeship outside the Union as described in paragraph (*b*) of sub-section (1) of section 27 of the Medical, Dental and Pharmacy Act, he shall produce proof thereof to the satisfaction of the Registrar.

11. The Board may grant exemption from further examination in all subjects, or any particular subject of the Intermediate Examination to the holder of a degree diploma or certificate relating to such subjects or particular subject granted after examination by an examining authority recognized by the Board, which, in the opinion of the Board, indicates a standard of training and knowledge in such subjects or particular subject not less than

that required by the Board in the case of candidates for the Intermediate Examination . . . .

PART I

13. A candidate desiring to enter for Part I of the Qualifying Examination for the Diploma in Pharmacy, shall apply in writing to the Registrar of the Board . . . .

. . . . (*b*) date on which he passed Preliminary Scientific or Intermediate Examination. (If the candidate has been granted exemption from writing either of those examinations, he must produce proof thereof.)

(*c*) the name of the chemist and druggist to whom he was apprenticed in the Union. If he served his apprenticeship outside the Union in accordance with the provisions of sub-section (1) (*b*) of section 27 of Act No. 13 of 1928, he must produce satisfactory documentary proof thereof, and his birth certificate or other documentary proof of his date of birth and his correct names . . . .

The application must be accompanied by—

(i) a certificate of having satisfactorily attended at least 80 per cent of the classes of the prescribed course of study at a recognized training institution covering one academic year;

(ii) the examination fee of £6 6s.

14. No candidate shall be admitted to the Qualifying Examination until he has completed to the satisfaction of the Board an apprenticeship of not less than two years under a contract registered by the Board.

15. No candidate shall be admitted to Part I of the Qualifying Examination until he has passed the examinations in all of the subjects of the Intermediate Examination.

PART II

16. A candidate for admission to Part II of the Qualifying Examination for the Diploma in Pharmacy shall apply in writing to the Registrar of the Board . . . .

The application must state—

. . . . (2) the date on which he passed Part I of the Diploma Examination . . . .

and must be accompanied by—

(*a*) a certificate from a recognized training institution o having satisfactorily attended at least 80 per cen. t the classes of the prescribed course of study, covering one academic year;

(*b*) the examination fee of £10.

17. No candidate shall be admitted to Part II of the Qualifying Examination until he has passed in all of the examination subjects of Part I of the Qualifying Examination.

18. If a candidate is successful in Part II of the Qualifying Examination and has not attained the age of 21 years his diploma shall be withheld until he has attained the age of 21 years.

19. A candidate for Part I or Part II of the Qualifying Examination for the Diploma in Pharmacy shall, on first admission, or (in the event of failure in more than one subject) on application for re-examination, present himself for examination in all subjects and, in each case, shall pay the full examination fee. Should he fail in one subject only, the Board may refer him for further study in that subject only, and, in such case, the fee for re-examination shall be £6. 6s.

20. The Board may grant exemption from further examination in any one subject of Part I or Part II of the Qualifying Examination to the holder of a degree, diploma or certificate of an examining authority recognized by the Board, which in the opinion of the Board indicates a standard of training and knowledge in that subject not less than that required by the Board in the case of candidates for that part of the Qualifying Examination.

GENERAL

. . . . 23. The following shall be recognized as institutions where courses of training and study for the Intermediate and Qualifying Examinations may be taken:—

Cape Technical College, Cape Town.
Natal Technical College, Durban.
Witwatersrand Technical College, Johannesburg.
The Technical College, Port Elizabeth.
The University of Potchefstroom, Potchefstroom.

The Board reserves to itself the right to withdraw recognition, subject to the approval of the Minister of Health, from any institution if at any time it is satisfied that its requirements in regard to the courses of training and study are insufficiently met.

24. A candidate who, having presented himself for either the Intermediate or Qualifying Examinations, or for the examination in a referred subject, fails to pass that examination, may be required to undergo a further course of study as directed by the Board at a recognized institution.

Appendix A comprises the syllabi of the Intermediate Examination and Parts I and II of the Qualifying Examination.

Regulations and Minimum Curriculum for a Degree in Pharmacy

The following Government Notice (No. 511 of 1955) was published in the *Government Gazette Extraordinary* of 18 March 1955:—

His Excellency the Governor-General has been pleased, under the powers vested in him by section 25 of the Medical, Dental and Pharmacy Act, 1928 (Act No. 13 of 1928), as amended by section 8 of the Medical, Dental and Pharmacy Amendment Act, 1954, and after considering a recommendation of the South African Pharmacy Board, to make the following regulations and minimum curriculum for a degree in pharmacy:—

1. The period of study between the date of registration by the Board as a pharmacy student and the date of admission to the final examination for any degree which entitles the holder to registration as a chemist and druggist after the completion of an apprenticeship of two years under a contract registered with the Board shall be a total period of certified study of not less than three academic years, excluding the said period of apprenticeship.

2. No student shall be enrolled at the university as a pharmacy student unless he is in possession of a certificate of registration as a pharmacy student given by the Board.

3. No student shall be admitted to the second year of study unless he has passed the examinations in all subjects of the first year examination or has been allowed a supplementary examination in one subject.

4. The examinations leading to a Degree in Pharmacy shall include examinations in at least the following subjects:—

Botany, theory and practical.
Chemistry I, theory and practical.
Physics, theory and practical.
Zoology, theory and practical.
Chemistry II, theory and practical.
Pharmacy I.
Practical pharmacy and dispensing.
Forensic pharmacy.
Physiology and pharmacology.
Chemistry III, theory and practical.
Pharmacognosy, theory and practical.
Pharmacy II.

No students shall be admitted to the examinations conducted during the second and third years of the course of study until they have passed the examinations in all of the subjects of the first and second years respectively.

5. The scope of the examinations shall be in accordance with the syllabus set out in Appendix A of these regulations.

6. The course of study for the first year, second year and third year examinations respectively shall be one academic year of full-time study. No student shall be admitted to the second year of study until he has completed to the satisfaction of the Board an apprenticeship of not less than two years under a contract registered by the Board in accordance with the rules published under sub-paragraph (i) of paragraph (2) of section 94 of the Medical, Dental and Pharmacy Act, 1928 (Act No. 13 of 1928).

7. The examinations in each subject shall be conducted by at least two examiners, one of whom may have taken part in the teaching of the candidate in the subject.

8. No candidate shall be considered to have passed an examination in any subject unless he has obtained at least 40 per cent of the possible marks in both the practical and theoretical papers and an aggregate of 50 per cent for both papers in the subject. In the case of pharmacy and dispensing he must have obtained at least 60 per cent in the practical paper and 50 per cent on the theory paper.

Appendix A comprises the syllabi of the subjects for the degree.

ASSOCIATION NEWS : VERENIGINGSNUUS

JAARVERGADERING VAN DIE TAK ORANJE-VRYSTAAT EN BASOETOLAND

Die Jaarvergadering van die Tak Oranje-Vrystaat en Basoetoland is in die Bloemfontein-klub, Bloemfontein, op 12 Februarie 1955 gehou.

Aanwesig dr. F. P. Jacobsz, president, en 26 lede.

Dr. Jacobsz het sy insignia aan dr. C. Derksen oorhandig en hom gevra om die stoel in te neem.

Verkiesing van Takraad. Vise-President—Dr. P. Connan, *Eresekretaris*—Dr. C. V. van der Merwe, *Eretesourier*—Dr. J. G. Muller, *Takraadslede*—Drs. Beck de Villiers, P. Neethling, J. D. Meyer en F. P. Jacobsz.

Die volgende verslae is gelees en aanvaar:

1. Verslag van die taksekretaris, dr. B. de Villiers. (Hieronder vermeld.)

2. Verslag van die tesourier, dr. J. G. Muller en die ouditeurs se rapport.

3. Verslag van Sentrale afdeling, dr. J. P. Theron.

4. Verslag van Noord-Oostelike afdeling, opgestel deur dr. J. M. W. Loubser, deur dr. Beck de Villiers voorgedra.

5. Basoetolandse afdeling: Verslag opgestel deur dr. A. C. Jaques en deur dr. de Villiers voorgedra.

6. Mondelinge verslae: Dr. C. Derksen namens die Noordelike afdeling en dr. F. N. Gillwald namens die Goudvelde.

REDE VAN UITTREDENDE PRESIDENT DR. F. P. JACOBSZ

Dr. Jacobsz se onderwerp was 'Should the Patient be Told he has Cancer', en sy gevolgtrekkings was bevestigend. Die toespraak sal in die *Tydskrif* gepubliseer word.

Dr. Derksen het dr. Jacobsz gelukgewens met 'n rede wat filosofies en geneeskundig van uitstaande gehalte was, en met die oog op die aard van die onderwerp is lede versoek om dit te bespreek. In antwoord op 'n vraag wat deur dr. Gillwald gestel is, het dr. Jacobsz die mening uitgespreek dat die prognose aan die pasiënt behoort meegedeel te word. Uit die bespreking wat gevolg het was dit duidelik dat die meeste lede dit eens met dr. Jacobsz was.

(*a*) Dr. B. de Villiers het voorgestel dat die vergadering dit goedkeur dat die Takraad in die toekoms gemagtig sal wees om die koste verbonde aan die jaarlikse dinee, of gedeelte daarvan, uit die fondse van die Tak te betaal. Hy voel dat so 'n beleid nie met die doelstellings van die vereniging teenstrydig sal wees nie, daar sosiale byeenkomste een van die belangrikste middels is om lewe in die werk van die Tak te bring. Dr. P. H. L. Barker het die regsgeldigheid van so 'n stap in twyfel getrek asook die vermoë van die Tak om sodanige koste te dra. Hy het gevra dat die Takraad eerder die onkoste van sprekers op vergaderings wat deur die afdelings gehou word, moet subsidieer.

Dr. B. L. Cockcroft was die mening toegedaan dat as daar 'n oorskot was, die jaargelde té hoog was of andersins dat die Takraad geld nuttig moes bestee. Dr. Connan was ook van opinie dat dit miskien nie regsgeldig of wenslik sou wees nie. Dr. Theron was van meing dat daar in elk geval eers behoorlike kennis van so 'n voorstel gegee moes word. Dr. de Villiers het sy voorstel teruggetrek. In die bespreking wat daarop gevolg het, het dr. J. W. van der Riet die mening uitgespreek dat meer vergaderings, ondersteun deur sosiale funksies, op verskillende plekke gehou moes word. Dr. R. S. Verster was van opinie dat die vereniging 'n spesiale heffing op lede vir dié doel moes lê. Op voorstel van dr. Gillwald en gesteun deur drs. Connan en Troskie is die volgende besluit, as opdrag aan die Takraad, geneem:

1. That the principle of meetings in different centres be accepted and

2. That the next such meeting be a special general meeting to finalize the matter and

3. Branch Council consider the matter of social gatherings and the raising of funds for this purpose.

(*b*) Dr. B. de Villiers het voorgestel dat die beginsel van die vergoeding van reiskostes en ander kostes van Takraadslede aanvaar word. Die voorstel is goedgekeur.

(*c*) Die voorstel dat dr. P. Connan gevra word om die Vergadering se dank aan die Bloemfontein-klub oor te dra, is aangeneem.

(*d*) 'n Uitnodiging van die Noord-Oostelike afdeling om die volgende jaarvergadering daar te hou is aan die vergadering bekendgemaak.

(*e*) Dr. R. Theron en dr. C. Derksen het dr. B. de Villiers vir sy uitstekende dienste as eresekretaris bedank. Dr. Verster het die Takraadslede bedank.

(*f*) Dr. F. P. Jacobsz voel dat ons nie buite ons eie kring bekend is nie en het voorgestel dat in die toekoms ook ander belangrike persone na die jaarlikse dinee uitgenooi word. Die voorstel het byval gevind.

(*g*) Dr. J. S. Visser het oor die naturelle-verpleegsters gepraat wat tans by die Nasionale Hospitaal as ‚diensmeisies' in diens geneem word. Behalwe ander foute wat hy te vinde gehad het, het hy gereken dat reëlings dadelik vir hul opleiding getref moes word.

(*h*) Hierop het dr. J. P. Theron die volgende mosie voorgestel wat eenparig aanvaar is: ‚Hierdie Tak van die Mediese Vereniging van Suid-Afrika wil die Provinsiale Administrasie formeel kennis gee dat hulle erg bekommerd is oor die wanadministrasie van hospitaalaangeleenthede in die Oranje-Vrystaat en veral in Bloemfontein.'

Op versoek van dr. P. M. S. Fischer is bygevoeg dat verteenwoordigers bereid is om die Administrasie te spreek.

Dr. E. Krause het die mening uitgespreek dat direk aan die Administrateur geskryf moet word en dr. Cockcroft het aangebied om die rapport van 'n griewe-komitee van die Sentrale afdeling tot beskikking van die Takraad te stel.

Dr. van der Riet het gevoel dat, as bogenoemde mosie aan die Administrasie geen vrugte afwerp nie, die feite aan die pers beskikbaar gestel moet word.

Die vergadering het om 5.45 nm. verdaag.

JAARVERSLAG VAN DIE ERESEKRETARIS

In ons Tak leef die Vereniging, maar meer belangstelling aan die kant van lede sal nie misplaas wees nie.

Afdelings. Verslae van die Sekretarisse sal aan u voorgelees word. Die totstandkoming van 'n sterk afdeling op ons Goudvelde is 'n groot gebeurtenis en ons kan hoop dat dit 'n bron van krag vir die Tak sal wees.

Takraad. U Takraad het vyf keer vergader. Die langste vergadering het die register vir Spesialiteite bespreek. Die aantal vergaderings is met opset beperk omdat baie van die lede lang afstande moet ry om hulle by te woon. Tussenin het die Uitvoerende Komitee besluite geneem, onder andere is 'n protesbrief aan die pers gerig omtrent sekere uitlatings in die Provinsiale Raad.

Ledetal. Met winste en verliese het ons ledetal op ongeveer 327 gebly. Op voorstel van u Tak is emeritus lidmaatskap aan dr. Hamilton W. Dyke deur die Federale Raad toegeken.

Federale Raad. In Julie 1954 was daar 'n verkiesing vir ons verteenwoordigers op die Federale Raad. Die volgende kollegas is gekies: Drs. D. J. Serfontein, R. Theron, C. F. G. Troskie en J. S. Visser. Van sowat 350 stembriewe uitgestuur is 137 teruggestuur, een was bederf en vier het te laat ingekom, twee waarvan geadresseer is nie aan my nie, maar aan die Sekretaris van die Nasionale Hospitaal.

Aanbevelings. Ek wil aanbeveel dat hierdie vergadering dit goedkeur dat die Takraad in die toekoms gemagtig sal wees om die koste verbonde aan die jaarlikse dinee, of gedeelte daarvan, uit die fondse van die Tak te betaal. Onder die hoof algemeen van ons agenda wil ek graag so 'n voorstel maak wat ek dan nader sal toelig.

Ek wil ook aanbeveel dat die beginsel deur hierdie vergadering goedgekeur word dat aan lede van die Takraad reiskoste en onderhoudskoste betaal word in verband met die bywoning van Takraadsvergaderings.

Beck de Villiers

PASSING EVENTS : IN DIE VERBYGAAN

Dr. M. P. Shapiro, F.R.C.S. (Edin.), D.M.R. (Lond.) has commenced a Radiotherapy practice on the First Floor, Jenner Chambers, Jeppe Street, Johannesburg (Telephone 22-6648), in association with Drs. I. A. Brotman and N. Saks. For the last 6 years Dr. Shapiro has been the Chief Radiotherapist to the Johannesburg Group of Hospitals and Lecturer in Radiotherapy to the University of the Witwatersrand. Before this he was Assistant Radiotherapist to the Liverpool Radium Institute, having previously been Registrar of the Radiological Department of the London Hospital.

* * *

Radiological Society of South Africa. The following office-bearers have been appointed for the year 1955-56: *Chairman*, Dr. H. I. Osler; *Secretary*, Dr. M. H. Fainsinger; *Treasurer*, Dr. F. McLachlan; *Elected Members of Council*, Dr. H. Jackson, Dr. J. Nel and Dr. C. Komins; *Ex-officio Members of Council*, Dr. M. Weinbren (retiring Chairman) and Dr. W. J. Latham (Chairman, Cape Western Branch of the Society).

* * *

The Students' Medical Council is holding its Annual Conference this year from 9 to 17 May. All the sessions will be held in the Harveian Lecture Theatre, Medical School, Johannesburg, at 8 p.m. The topic is *Pregnancy*.

The programme is as follows: Monday 9 May: (1) Opening address; (2) *Some Thoughts on the Nature of Labour in the Light of Recent Observation and Therapy* by Professor O. S. Heyns and Dr. E. C. Halliday.

Tuesday 10 May: (1) *Heart Disease in Pregnancy* by Dr. F. Daubenton and Dr. B. van Lingen; (2) *Toxaemia of Pregnancy* by Dr. L. G. R. van Dongen.

Thursday 12 May: (1) *Advanced Extra-Uterine Pregnancy* by Dr. G. P. Charlewood; (2) *Malpresentations in the Bantu Parturient* by Dr. L. W. P. Lavery.

Monday 16 May: (1) *The Expectant Treatment of Placenta Praevia* by Dr. N. E. C. de la Hunt; (2) *Post-Partum Haemorrhage* by Dr. S. Joel Cohen; (3) *Relief of Pain in Labour* by Dr. A. C. Naylor.

Tuesday 17 May: (1) *The Grande Multipara* by Dr. L. G. R. van Dongen; (2) *Trial of Labour—Some of its Aspects and Present-Day Problems* by Dr. J. F. C. Grant.

* * *

Mr. Arthur J. Helfet, M.D., M.Ch.Orth. (L'pool), F.R.C.S., Cape Town, who has been invited to lecture and to demonstrate orthopaedic operations at the Medical School of the Hebrew University, Jerusalem, left on 28 March, and will be away for 4 weeks.

* * *

Tropical Research Fellowship (Medical Sciences). Applications are invited by the Council of the Royal Society for a Research Fellowship with special reference to ill-health in the tropics. The Fellowship is tenable in any university, hospital or medical school or other institution approved by the Royal Society in the British Commonwealth. The successful applicant, who need not necessarily hold a medical qualification, will be expected to spend some part of the period of tenure in the tropics.

The appointment will be for 2 years in the first instance, from 1 October 1955, and may be renewed annually up to a total of 5 years. It will be subject to the conditions governing Royal Society research appointments. The stipend will be £1,250 per annum.

Applications, which should be made on forms to be obtained from the Assistant Secretary, The Royal Society, Burlington House, London, W. 1, should be received as early as possible, and in any case not later than 31 May 1955.

* * *

Dr. A. I. Goldberg of Cape Town left for England on the Pretoria Castle on 25 March. He intends visiting Gynaecological Clinics in the United Kingdom and on the Continent. He will attend a number of Conferences and will represent the Association at the 9th General Assembly of the World Medical Association in Vienna.

POLIOMYELITIS IN THE UNION

Following are the returns, supplied by the Union Department of Health, of cases notified under the Public Health Act as suffering from Poliomyelitis in the period 18 to 24 March 1955.

	European	*Non-European*
Transvaal:		
Johannesburg	4	
Edenvale (Fatal)	1	
Pretoria	1	2
Potgietersrust		1
Nebo		1
Potchefstroom district	1	
Krugersdorp P.U.A.H.B.	1	
Witbank	1	1
Belfast district		1
Total for Transvaal	9	6
Cape Province:		
Cape Town Divisional Council		1
Total for Cape Province		1
Natal:		
Durban	2	
Umlazi		1
Malvern	1	
Howick		1
Estcourt district		1
Pietermaritzburg	1	
Richmond		1
Msinga district		1
Total for Natal	4	5
Orange Free State:		
Reitz district		1
Hobhouse	1	
Total for Orange Free State	1	1
TOTAL FOR THE UNION	**14**	**13**

Union Department of Health Bulletin. Report for the 7 days ended 24 March 1955.

Plague, Cape Province: No further cases have been reported from the St. Marks district since the notification 8 of 24 February 1955. This area is now regarded as free from infection.

Smallpox, Typhus Fever: Nil.

Epidemic Diseases in Other Countries:

Plague: Nil.

Cholera in Calcutta, Pondicherry (India); Chalna, Chittagong, Dacca (Pakistan).

Smallpox in Kyaukpyu, Moulmein, Rangoon (Burma); Phnom-Penh, Ahmedabad, Allahabad, Alleppey, Bombay, Calcutta, Cochin, Delhi, Jodpur, Kandla, Kanpur, Lucknow, Madras India); Dacca, Karachi, Lahore (Pakistan); Nhatrang (Viêt-Nam); Mogadiscio (Somalia); Tanga (Tanganyika).

Typhus Fever: Nil.

QUESTIONS ANSWERED

TREATMENT OF NEPHROSIS WITH MALARIA

Q. What progress has been made in the treatment of nephrosis with malaria?

A. Partial or complete remission of the nephrotic syndrome is known to follow or accompany certain infections. Induction of malaria as a form of treatment for a nephrotic syndrome was first reported independently by Byrne and by Gairdner in 1952. Byrne described complete remission in a boy with a nephrotic syndrome, while Gairdner reported remission in 2 out of 4 cases. In both of these cases, however, proteinuria was noted from time to time. More recently Porter (1954) has reported an apparent complete remission accompanying malarial therapy in a boy who developed the syndrome 3 years after an attack of type-1 nephritis. It is still too early to assess the completeness of this response.

Thus although malaria may induce a dramatic remission in some cases of the nephrotic syndrome final evaluation of this form of therapy must await prolonged follow-up and it should not supplant standard methods of treatment. The precise mechanism of the action of malaria is as yet unknown. A similar and more easily induced remission may accompany the use of ACTH or cortisone.

L. Eales

Byrne, E. A. J. (1952): Lancet, **1**, 844.
Gairdner, D. (1952): *Ibid.*, **1**, 842.
Porter, R. (1954): Brit. Med. J., **2**, 1398.

IN MEMORIAM

DR. GUSTAV DIRK LIEBENBERG

Dr. R. Rodseth of Pretoria writes: The recent sudden death of Dr. Gustav Liebenberg at the early age of 30 has robbed Pretoria of a young doctor who in a short time built up an extensive practice by virtue of his zeal and interest in his work, and the friendly and unselfish way in which he applied it.

His many friends will miss his cheery spirit and sincere companionship. Gustav Liebenberg was a man in a hurry, and in his short but eventful life accomplished what many would yearn to do in twice the time. During the last war he served in the South African Air Force, both in the Middle East and Africa, and after qualifying M.B., Ch.B. at the University of Pretoria in 1950 commenced practice in Pretoria North. In spite of his rapidly expanding work, he nevertheless made time to take on the additional duties of acting medical officer, and lecturer in First Aid to the Noodhulpliga.

The large congregation which attended the moving funeral service testified to the affection and esteem in which he was held, and our hearts go out to his young widow, who stood by him from his early student days, as a partner in his work and at home.

NEW PREPARATIONS AND APPLIANCES : NUWE PREPARATE EN TOESTELLE

Messrs. Noristan Laboratories (Pty.) Ltd. of Silverton, via Pretoria, are now manufacturing certain preparations in their local laboratories under the formulae of Nordmark-Werke of Hamburg, Artesan GmbH, Jesteburg, and Aste-Werke A.-G., Brackwede (all of Germany). Five preparations have been marketed, and the manufacturers advance the following information:

1. *Aristamid* (6-sulphanilamido-2:4-dimethyl pyrimidine, tablets 0·5 g.). Possessing a pyrimidine (diazine) ring, characteristic features of Aristamid are rapid absorption and tardy elimination. It follows that a constant, high and therapeutically active blood-level is quickly established and long maintained.

The possibility of crystallization in the urinary passages is also very low. In extensive studies it was shown that Aristamid penetrates the tissues more easily than other sulphonamides, being as high as 75% of the blood level. Thus, a therapeutically effective tissue-concentration is easily established. Indications include respiratory and urinary tract infections. A schedule of dosage can be followed which allows an 8-hour interval, obviating the need for nocturnal medication.

2. *Avacan* (tablets 50 mg., ampoules 1 c.c.) is a synthetic antispasmodic with combined neural and muscular action. It acts preferentially on smooth muscle, and exerts no great influence on glands, the eyes, the heart or the blood-vessels. Indications include most conditions in which smooth-muscle spasm occurs, including angina pectoris, bronchial asthma, enteritis and ureteric colic. Administration by oral, subcutaneous, intramuscular or intravenous routes.

3. *Enzynorm* (a biologically standardized acid-enzyme preparation for substitution therapy in deficiency of gastric secretion, by tablet). This preparation is a whole extract of the gastric mucosa and comprises a high concentration of the normal pepsin in physiological union with protein-bound hydrochloric acid. Indications include all disorders of the digestive tract based on deficient or impaired production of gastric juice.

4. *Gynedron* (6-sulpha-dimethyl-diazine (2%) with borax (1·5%) and lactose (5%)), and *Oestro-Gynedron* (containing in addition stilboestrol dipropionate 5 mg.). These are vaginal creams (used with tube and applicator) which, with their non-greasy, hydrophilic, inorganic colloidal gel, overcome many disadvantages in the standard treatment of vaginitis. The gel has an affinity for the mucous membrane, adheres to the undulations of the vaginal walls, fixes pathological products and bacteria by means of adsorption and adheres to the mucosa for a long period. The prolonged activity is due to this 'coating effect' of the vehicle. Since impaired function of the ovaries (even though only slight) is often a contributory cause of vaginitis, there exists the possibility that despite the restoration of normal physiological conditions of the vaginal flora, the epithelium does not respond normally. The oestrogenic component is therefore added to stimulate proliferation of the epithelium. Such small proportions of hormonal ingredients are present that general reactions and cycle changes do not occur.

5. *Pyodron* (6-sulpha-dimethyl-diazine, by lotion) is a hydrophilic inorganic colloidal gel which complies fully with the medical requirements for the treatment of pyogenic skin diseases or lesions liable to infection. This is due to the choice of a novel vehicle which does not, as greasy bases do, form a separating layer between the medicament and the wound secretion but allows the active principle to come into full and effective contact with the affected area. Allergic reactions are negligible and no sensitizing effect has ever been reported. Indications include all pyogenic skin diseases as well as itching lesions and minor burns.

CORRESPONDENCE : BRIEWERUBRIEK

THE GENERAL PRACTITIONER

To the Editor: I should like to support and amplify some of Dr. van Lingen's statements on the position of general practitioners in the hierarchy of the medical profession.[1]

Despite frequently repeated statements that the G.P. is the backbone of the profession there is no doubt that his status in the eyes of his specialist colleagues and of the public has been sinking whilst the position of the specialist has been greatly elevated. This is largely due to the fact that specialization and the division of labour in all fields of scientific endeavour have produced enormous advances in our understanding of various *aspects*

of man and his environment. But fragmentation and analysis are useless without an accompanying integration of our new facts into the existing framework of our knowledge.

It is not sufficiently recognized that the general practitioner is a specialist integrating a number of medical and social skills in dealing with the patient as a functioning member of society. The G.P.'s skills are as distinctive as those of other specialists. The specialist surgeon can no more carry out the functions of an efficient G.P. than the latter can perform modern operative surgery.

What are these special qualities which the good general practitioner brings to his patients? In broad outline they are those abilities which make the best use of the patient's personal, family, and community resources in modern medical diagnostic and therapeutic procedures. This necessitates recognizing that the patient is an integral part of his physical, biological, and social environment, and then modifying or manipulating the internal or external milieu of the individual to his advantage. Only a small part of this therapy is pharmacological. The greater part of the G.P.'s usefulness consists in altering the attitudes and habits of the patient and his family. A middle-aged widow with an unhappy childhood and 5 small children had her gall-bladder, appendix, uterus, coccyx and patella successfully treated by operation. In the hands of an understanding G.P. who knew her as a person, more of her meagre resources would have been spent on the education of her children rather than on her numerous operations, which did not relieve her symptoms.

The special knowledge which the family doctor or the general practitioner can contribute to medical science and education is poorly recognized at present, even by the G.P. himself. This is partly due to the fact that these aspects of medicine are included largely in the field of the applied social sciences—new and difficult areas of investigation. But the chief reason for this neglect is that the principles of general practice are poorly formulated at present—for the simple reason that the methods of general practice are now only beginning to be taught to present-day medical students and the experience of communicating what one knows to others is productive of clear thinking and scientific attitudes.

Is it not time that general practitioners played a recognized part in the training of undergraduate students in our South African medical schools? Could we not begin in a modest way by apprenticing senior students to suitable G.P.s and so enhance the status of general practice and general practitioners?

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Mowbray, Cape
23 March 1955

1. Van Lingen, S. A. (1955): S. Afr. Med. J., **29**, 284 (19 March).

TOO MANY DOCTORS

To the Editor: In our *Journal* of 26 February[1] you report the valedictory address of Dr. J. H. L. Shapiro, the retiring president of the Cape Western Branch of the Association. I agree wholeheartedly with his remarks, and should like to comment on his observations under the heading 'The Medical Association'.

It is true that the doctor has to make a living, and also that doctors are in many instances underpaid. Dr. Shapiro gives some examples, such as part-time Medical Officers of Health at £5-£10 a month, and capitation fees in contract practice of as low as a tickey a week. This is a deplorable state of affairs, but the fact that many members of our profession are today in dire financial straits can, in my opinion, be traced to the fact that there are too many doctors in South Africa.

In the days when there were fewer doctors their services were at a premium, but today, with so many competitors for even the lowest-paid job, it is obvious that some must be prepared to work for ridiculous remuneration in order to keep the wolf from the door. Owing to the host of specialists required today to deal with even the simplest complaint, illness has become very expensive. If patients club together in a benefit society or a medical aid society to cut down the cost of illness, can we blame them for that?

We have at present 4 medical schools in the country mass-producing doctors, and a 5th is to be added next year. Is there really a shortage of doctors in the country that so many must qualify each year? Let our Association conduct an enquiry into medical education and the need for and overproduction of doctors, and let us advise the public and the State of our findings. In that way we may be able to stop the rush of young men and women into medicine, this already overcrowded and underpaid profession.

In time to come a sufficient number of financially embarrased and disgruntled doctors will allow the introduction of a full-time salaried State medical service. This would benefit everyone except the doctors themselves. Yet unless the overproduction of doctors can be regulated that must be the inevitable result. A statement from the Association on medical education in all its aspects, with emphasis on the economic angle, is long overdue.

In conclusion may I say that I am a medical missionary, and so this is not a case of sour grapes.

Whither Medicine?

22 March 1955

1. Shapiro, J. H. L. (1955): S. Afr. Med. J., **29,** 213.

METHODS FOR THE EARLY LABORATORY DIAGNOSIS OF TYPHOID FEVER

To the Editor: The large majority of *S. typhi* isolated from humans possess the Vi antigen. It has been shown (Coetzee [1]) that these organisms shed this in a watery milieu. It would consequently be reasonable to assume that Vi antigen could be spontaneously liberated when blood containing *S. typhi* is incubated in a suitable medium. This antigen is capable of absorption onto human and sheep erythrocytes, sensitizing these cells in such a way as to cause specific agglutination with Vi antiserum. We therefore tested blood containing *S. typhi* by means of the ring precipitin test and haemagglutination procedures to determine whether Vi antigen was liberated in detectable amounts.

The use of a bile-broth culture-medium precludes a subsequent haemagglutination test and also complicates the ring precipitation test. Bottles containing brain-heart-infusion broth were consequently used for blood-culture purposes. After a period of incubation the contents of the bottle were mixed and some of the red-cell suspension withdrawn. Some of this suspension was used for subculturing and the remainder was centrifuged to separate the cells from the fluid. A ring precipitin test was done on part of the clear fluid and the remainder was used for sensitizing sheep red-cells. Haemagglutination tests were carried out with the human red-cells as well as with the sensitized sheep cells. The Hübener-Thomsen phenomenon was encountered with some frequency in the haemagglutination tests with human cells, rendering this test rather unsatisfactory. Vi antigen was, however, detected with the haemagglutination test when sensitized sheep cells were used, and with the ring precipitin test in all cases where *S. typhi* was isolated from the culture medium.

The results of the two tests tallied completely. On a few occasions these techniques have enabled us to anticipate results of the sub-culture by 18 hours. The precipitin test, which can be read within 15 minutes, is to be preferred because of its simplicity. False positive reactions were not encountered in the limited series investigated.

Ring precipitin tests were performed on sera and urines of patients in the bacteraemic phase of typhoid fever to investigate the possibility of the organisms also shedding Vi antigen in detectable amounts in the bloodstream. All results were negative. Haemagglutination tests on the erythrocytes of these patients were also uniformly negative.

The limited number of cases investigated appear to justify the following preliminary conclusions:

1. During incubation in blood-culture media Vi antigen is liberated by *S. typhi* in detectable amounts.

2. By using the procedures described above, the time required to establish a laboratory diagnosis of typhoid fever may be considerably shortened.

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22 March 1955

1. Coetzee, J. N. (1955): In press.